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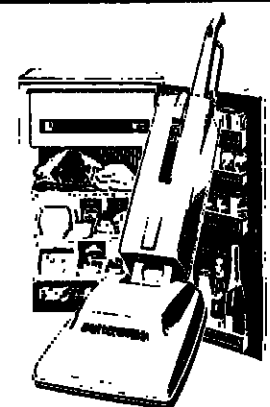
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Salary within scale £3185-£4130 (under review). Further details and application forms from Professor R. Bell, Department of Engineering Production.

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Application forms obtainable from the Personnel & Recruitment Officer, Directorate of Management Services, London Borough of Lambeth, Lambeth House, Brixton Hill, SW2, or telephone 01-772 7722 Ext. 696. Closing date 28th July 1978.

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## INTERNATIONAL NEWS IN BRIEF

### SEMS plans new mini line

FRENCH minimaker SEMS plans to introduce a new line of minicomputers to replace the ageing Mitra line inherited from CII. The new machine, designated series S is due to appear at the end of the year or the beginning of 1979, and is said to offer a price-performance better than that of SEMS' other product line, the Solar 16, inherited from Télémécanique.

However, concern has been expressed in France at the departure of several former Télémécanique employees, and at the impact that the Honeywell Level 6 mini, shortly to be built by CII-HB as the Mini 6, will have on SEMS' business.

### Swiss deal

SWISS marketing of Digico's new M16E minicomputer is to be handled by Infotech, a subsidiary of Bachofen AG of Zurich, a leading Swiss company in industrial automation. The first machine has been installed at the company's headquarters, but a Digico machine has been running at Zurich University geology department since 1973.

### NCR \$280m sale

THE sale of NCR's Appleton Papers division to British American Tobacco for \$280 million, announced eight weeks ago (CW, May 11), has now been completed. NCR wants to devote all its resources to expansion of its computer, terminal, DP equipment and services business.

### US takeover

GRAPHIC display systems bidder, Imiac, and Hazeltine, which is best known in Europe as a major OEM supplier of alphanumeric displays, have signed a letter of intent which will probably lead to Hazeltine acquiring Imiac. Hazeltine and Imiac, both based in the US, had revenues of \$88 million and \$4.5 million respectively in their last fiscal years.

### Sabena system

BELGIAN national carrier Sabena is spending \$3 million with Univac on an I100/12 mainframe and UTS 400 terminals which will be used to run air cargo and message switching applications. Sabena runs its reservations on another Univac system, Air France's Alpha 3 in Paris.

## Interdata-based IBM emulator comes to Europe

LATEST IBM-compatible processor to enter the European market is a product built around the Interdata 7/32 mini with added microcode for the IBM 370 instruction set.

Launched a year ago in the US, the machine is called Duo 70 and was developed by Kardos Systems Corp of Gaithersburg, Maryland (CW, July 28, 1977). It is being marketed in Europe by Intersystems AG of Basel, Switzerland.

The firmware emulator operates with the Interdata OS/32 MT operating system in parallel with other tasks, which means that IBM 370 programs can be run alongside programs written in native mode for the Interdata machine. The Duo 70 is claimed to offer the performance of an IBM 370/145 at one tenth the cost.

Duo 70 is effectively confined to programs written to run under DOS or OS, and while VS programs can be run, they need to be restructured to permit 'memory' overlays, since the 7/32 is a non-virtual minicomputer. Compilers from both Interdata and IBM are supported, and database systems available on the mini include Total and System 2000.

## US databases offer to Third World countries

THE US government is expected to offer developing countries terminal access to all the major databases publicly available in the US as its principal contribution to a big inter-governmental congress on computer development which takes place in Spain next month.

Called SPIN, Strategies and Policies for Informatics, conference, the meeting takes place in Torremolinos, Spain, from August 28 to September 6.

The SPIN conference is being organised

by IBI, the Intergovernmental Bureau for Informatics, headquartered in Rome. IBI currently has 26 members, but nearly 100 countries are expected to be represented at the conference, most of them by the government minister responsible for computer policy.

There are three Western European member countries, France, Italy and Spain, and France is the leading member, putting up 30% of IBI's annual \$2.5 million budget. The other members are all non-aligned Third

World countries in Latin America, the Middle East and Africa.

The purpose of the conference is to bring about an exchange of information on the establishment of national computer policies, to highlight the ways in which computers can aid development, and to establish a framework for international assistance and co-operation in computing.

Two member countries, Tunisia and Ecuador, have established national computing plans with the assistance of IBI.

## CII-HB price cut wins £7m contract

From Pelle Bergstrom in Stockholm

A LAST-MINUTE price cut, made "in anticipation of falling hardware costs", has helped CII-Honeywell Bull to become the surprise winner of a major government contract in Sweden over the majority of Swedish-owned Saab-Univac. The contract, for 22 medium-scale Level 64 systems, ends a six-year period in which every major State contract has gone to Univac.

Worth 59.9 million Swedish Krone, about £7.1 million, the order is for French-built Level 64/40, 64/30 and 64/20 machines for regional tax authorities, and covers enhancements and

maintenance up to 1990. Until the last minute, the two leading contenders for the contract were Saab-Univac, bidding 90/30s, and Siemens, with 7.738s and 7.730s. The systems are to be linked to a large-scale Univac 1100 mainframe in Stockholm, which has already been installed; at present, 14 of the regional tax offices have old Datasab D21, D22 and D230 mainframes, and Saab-Univac offered to buy these back in furtherance of its bid.

Univac's bid was ruled out on the grounds that regional planning applications may be added to the systems later, and the

90/30s had insufficient capacity. That left Siemens, whose 7.700 systems had the edge in both price and performance; but the company has a 'limited service organisation in Sweden.

Siemens' original bid in March was SKr 69 million, which was higher than either CII-HB's SKr 64.4m or Saab-Univac's SKr 61.5m. However, Siemens subsequently undercut Univac, and the latter responded with a cut to SKr 57.7 million.

Honeywell's last big State order was for the social security agency in 1971, since when all major orders have gone to Saab-Univac.

## Human rights concern as US ships three fingerprint systems to Brazil

From Hesh Wiener in New York.

THE US State Department has approved the sale of three powerful computer-based police fingerprint systems to Brazil, despite fears that they could be used to infringe human rights.

Recently, the State Department refused to permit similar systems to be shipped to the

Argentinian government. The Brazilian police dossier systems, which automatically classify and retrieve information based on fingerprints are reportedly being built by a division of California-based Rockwell International and are similar to those being used by the

Royal Canadian Mounted Police.

According to State Department sources, three systems will be sold to the Brazilian government. They will be operated by the State police and the Secretariat of Public Security in the States of Bahia, Sao Paulo and Brasilia. The export licences for the systems, recently approved, have been under consideration since January.

State Department sources say that each system is worth about \$5 million. Total processing power of each unspecified configuration is said to be 16 mips, implying that the machines have multiple processors. Official sources said that the three systems were similar, but would not say whether they were all identical.

The storage capacity of each computer will include two million bytes of main memory and 2,400 Megabytes of disc capacity.

## \$66,000 award to Datapoint in 'equal opportunity' suit

A JUDGMENT for legal costs amounting to \$66,540 plus 9% interest has been awarded to Datapoint Corp, manufacturer of intelligent terminal systems, against the US Equal Employment Opportunity Commission. The Commission brought a suit against Datapoint in 1974 alleging discrimination against blacks, Mexican-Americans, and women, but lost the case.

The Federal Appeals Court in San Antonio, Texas, has upheld the judgment in favour of Datapoint, saying that the Commission's action was "frivolous" and brought "in bad faith". The award of costs is the largest the EEOC has had to pay.

A spokesman for the EEOC would not comment on the case other than to say, "The suit was brought in good faith."

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## Systems analysts on \$24,786 a year

SYSTEMS analysts in the US, on average, earn \$24,786 a year, with 26% receiving over \$30,000, according to a survey by the Association for Systems Management, while the average starting salary was found to be \$18,000.

The survey also showed that job switching is continuing to increase - 21% of those questioned had worked at three or more jobs, while 31% had worked for only one company. A similar survey in 1969 had found that 13% had changed jobs more than three times.

Two-thirds of the respondents had at least one degree, and 23% had a master's degree or doctorate. However, those with no university education showed a slight increase in number, but their median salary was \$23,000, as opposed to the graduates' \$26,000.

The responses were taken from 3,355 members of the ASM.

## Norway wins Indian order

THE contract to specify the network and install the large computer system for India's National Informatics Centre has been won by Norwegian bureau, Computas of Oslo.

The National Informatics Centre is being established in New Delhi as an information retrieval system and national planning tool for most of the ministries in the Indian government.

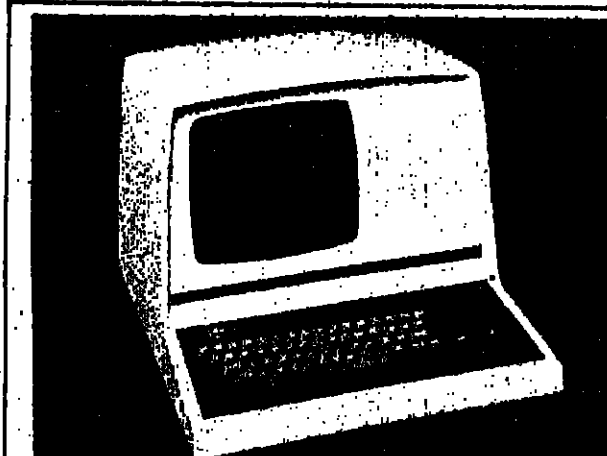


Ex-NATO chief  
joins Raoul

A FORMER NATO Supreme Commander and British Chief of Defence Staff, Admiral of the Fleet Sir Edward Ashmore GCB, DSC, has joined the board of Raoul Electronics Ltd, the holding company for the international Raoul Electronics group.

Sir Edward retired last year after 44 years' distinguished service in the Royal Navy, during which he specialised in communications, a key area of Raoul's activities.

For 10 years before he became a NATO Supreme Commander and British Chief of Defence Staff, Sir Edward had responsibility for the operational and technical administration of naval communications on sea and land.



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## NEWS AND VIEWS FROM SOUTH AFRICA

## Dilemma over role of US business in apartheid

THE role of US business in South Africa, and particularly that of the computer industry, is commanding substantially more attention these days than ever before.

Two reports on this business involvement in South Africa, which represent widely divergent political viewpoints, have just been produced in the US. Both examine the morality of providing computers to the South African regime. Each study purports to consider, as the basis of any worthwhile business policy, the welfare of all the people of South Africa.

The case for US computer companies refusing to do business in South Africa is set forth in a soon to be published report written by Richard Leonard, a former staff member of the American Committee on Africa, a New York-based anti-apartheid organisation.

The ACOA study, an advance copy of which was made available to Computer Weekly, looks at the extent of US computer industry penetration in South Africa and at the resulting dependency of the South African economy and the system of apartheid on American companies.

The case for doing business in South Africa was presented by Fortune magazine in an article by Herman Nickel, a member of the magazine's board of editors.

Fortune does not focus on the computer industry, but its concerns and conclusions apply to all US corporations in South Africa. Fortune comes out in favour of the continued presence of American industry in South Africa. It notes that: "It is true that in some sectors the American role is critical, probably the most important being computer technology, where US companies led by IBM control 70% of the market."

Fortune puts forward the thesis that US investment in the South African economy is needed for peaceful change. It also holds that "for many black workers in South Africa, training programmes in American companies provide a major part of their entire education."

The ACOA report, entitled "Computer apartheid: the role of US computer companies in South Africa", states that the largest computer user in that nation is the government, controlled by the 16% of the population that is White. ACOA argues that computers are used for the

implementation of apartheid, for military and policy functions and for economic purposes.

According to ACOA's statistics, there are five US mainframe companies with operations in South Africa. In some cases these companies sell small computers as well. The companies are IBM, Burroughs, Control Data, NCR and Univac. Other US computer companies with operations in South Africa are Hewlett-Packard, Data General, Datapoint, Computer Automation and Computer Sciences.

In addition, there are several US companies which have computers in South Africa but which do not have computer operations there at present. Honeywell has withdrawn from the computer market, although it still has other corporate operations in South Africa. Digital Equipment has no South African offices, but it has sold some of its computers there. Foxboro Corp. has at least two of its Fox 1 computers installed in South Africa used at the strategic Valindaba uranium enrichment plant, but no South African offices.

Historically, according to the ACOA report, South Africa was late among the industrialised countries to enter the computer age. The first computer in South Africa, a UK one, was not installed until 1959. During the 1960s the installed base expanded at a rate of more than 30% annually and by 1970 there were an estimated 400 computers in the country with a value of \$100 million.

It was during the growth period that US manufacturers came to dominate the South African market, led by IBM. By 1974 the total number of systems in South Africa was estimated at more than 1,000, with a value of \$365 million. And while its economy fell into a recession in the mid-70s, computers were "selling like hot cakes", with market growth estimated at between 20 and 30% annually.

In September, 1978, South African Interior Minister Mulder said that there were 1,500 computers in the country representing an investment of more than \$500 million. Management magazine of South Africa noted in its December, 1977, computer survey that only the US and the UK spend more than South Africa on computers as a percentage of gross national product.

This same survey also noted that while the US computer companies still dominate the South African market, ICL had replaced IBM as the market leader. In 1977, ICL sales jumped by 68%, compared with an industry average of 25%.

The reasons for ICL's rapid expansion are not clear, but tighter US regulations on computer sales to South Africa could be a factor. South African fears about the impact of US restrictions has led to the growth of indigenous South African manufacturers (CW, March 23).

According to ACOA, in the sale of microcomputers and minis US companies face competition from the UK, Japan, West Germany, Italy and now the local South African companies as well. But the only companies now in South Africa capable of providing mainframes, aside from US suppliers, are ICL and Siemens.

Fortune magazine points out that sentiment in Washington is increasingly turning against South Africa, "particularly since the rioting in Soweto in 1976 and the explosion of worldwide outrage over the case of Steve Biko".

The publication also cites the US Senate report, prepared under the chairmanship of Senator Dick Clark, which said that the abysmal record of US employers in South Africa threatened to undermine "the fundamental goals and objectives of US foreign policy."

Other Congressional action directed against South Africa is in the works, including a Bill that would cut off government loan guarantees. This action Fortune calls "extreme."

Concern over the effectiveness of current US efforts to curb certain computer industry involvement in South Africa led ACOA to conclude that "the current restrictions by the Carter Administration, while posing a hindrance to the White regime, certainly fall short of any serious effort to end the involvement of US computer companies with apartheid."

Faced with growing pressure from groups like ACOA, US computer manufacturers have been issuing public statements in defence of their activities. The US computer companies maintain that their presence is a moderating force and that they provide jobs and opportunities for advancement for non-Whites.

Major battle looming for mini market

A MAJOR battle is now going on for the minicomputer market in South Africa, according to Peter Godsell, a director of Leonard Fine Associates, a company which specialises in computer market research in that country.

He says the mortality rate is likely to be high since the battle will probably lead to a new round of price-cutting as mainframe suppliers prepare to muscle in on the market for small computers.

"The computer market in this country," Godsell observes, "is constantly changing in terms of both computer supplying companies and an increasing flow of new, better and cheaper products."

"We have seen companies such as Honeywell and Siemens enter the market and then depart. The British giant ICL took over the Singer Business Machines market and some of the big US companies have established themselves as forces in the market only recently."

This year, Godsell adds, several new minis and systems have been introduced, including Prime, which is marketed by the

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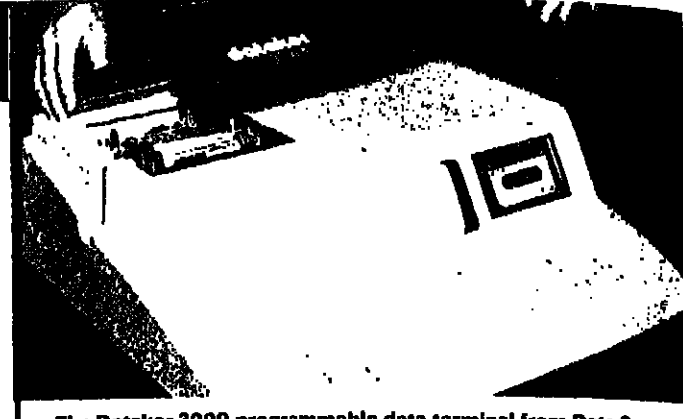
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The Datacor 3000 programmable data terminal from Data Corp.

## Durban places first orders for program terminals

THE City of Durban has placed the first order for 35 new South African-designed and manufactured programmable data terminals which have a local content of 72%.

The Datacor 3000, manufactured and distributed by Data Corp., the newly-established computer arm of the Mercedes Office Equipment Group in Johannesburg, is designed to fill a gap in the market for data collection and receipting facilities, said the company's marketing manager, John Anderson.

The Datacor 3000 is a microprocessor-based terminal, which can be used as a stand-alone unit or online. It can handle a variety of data capture, accounting and point-of-sale applications.

Present options include custom-designed keyboards, a second cassette tape deck and a software-controlled cash drawer. Future options are likely to include up to 32K EPROM storage, up to 8K data storage and a wand reader.

Anderson believes that there could be an export market for the Datacor 3000 terminal in independent African States, Europe, the UK and Australia.

## Theatre and cinema ticket system launched in Australia

THE successful South African computerised theatre and cinema ticket reservation service, Computicket, is exporting its expertise to Australia, and plans are in hand to bring it to the UK, Europe and Canada.

The Australian venture, scheduled to open in Sydney next month, will essentially be a duplication of the operation in South Africa which has 77 Ontel terminals in the Transvaal linked online to 32-bit Interdata minicomputers used in conjunction with Di-An printers.

Computicket Australia, in which Computicket South Africa holds an undisclosed share, will go live in Sydney with 120 Ontel terminals at a cost of \$A3.5 million.

The service is to be extended to Melbourne and Brisbane before the end of the year.

Computicket South Africa has converted to its own Interdata 8/32s from being an IBM bureau customer. The conversion of more than 100,000 program statements was, says managing director Percy Tucker, accomplished without the use of translators or other programming aids by Compower, an independent software house, because none was available either locally or overseas. The changeover was accomplished in a single weekend.

Tucker says that selling the concept in the UK, Europe and Canada, will be tough but he says he has already received several inquiries from foreign parties interested in franchising the Computicket system in their own countries.

Distribution agreement

ONE of South Africa's largest producers of printed business forms has entered the field of computer media supplies. Masterform, a subsidiary of the multi-million pound print and packaging group, Kohler

Brothers, has been appointed distributor for Memorex magnetic tapes and discs in South Africa.

The distribution agreement was formally signed in Johannesburg.

Marketing deals

MAGNETIC tape transports produced by Digi-Data are to be marketed in the Benelux countries by Megavolt of Holland and in Norway by the Oslo-based Morgensterne.

Dublin office

To handle growing business in the Irish Republic, Data General has opened a Dublin office at St. James' House, Lower Baginbun Street. Sales and software support had previously been provided from Manchester, but the entire operation will now be carried out locally.

Fujitsu subsidiary profit

THE Australian subsidiary of Fujitsu, Facom Australia, came into profit for the first time in the year to March 1978, but still has a long way to go to wipe out its accumulated losses of \$A9.03m, which include a

## Australia is hit by computer crime

BUSINESS in Australia is hit increasingly by computer related crime, but management is burying its head in the sand and hoping that the problem will go away. Making this comment, the Sydney chapter of the Electronic Data Processing Auditors' Association says that an increasing proportion of the \$A500 million a year that "white collar" crime is said to cost now involves computers.

A spokesman for the association said it was estimated that there were about 2,000 computers in the country and about 20,000 DP staff. Although that was small by US standards, it was worth remembering that the foreign assets and investments they control were not.

## NEWS IN BRIEF

## IBM profits doubled

A DRAMATIC surge in IBM Australia's profits has been reported for 1977. The big improvement is attributed to the high level of outright sales.

Profits at \$A16.55 million after tax of \$A13.79 million were more than double the 1976 figure of \$A7.75 million on a turnover of \$A181.9 million, up from \$A120 million in 1976.

## PoS network

WITH orders for 780 NCR 2151 point-of-sale terminals, 42 NCR 796 VDUs, 74 NCR 280 terminals, and four NCR 725 minicomputers, Australian department store group Waltons has begun its plan to install a major PoS network at its stores over the next three years. The PoS network will be linked by Post Office lines to an NCR V-8550 Criterion system in Sydney, and it will enable Waltons to monitor and control profitability, inventory, sales trends, and advertising more efficiently, as well as improving customer service.

## Latin exchange

WHAT is claimed to be the first digital telephone exchange in Latin America will be installed in Caguas, Puerto Rico, and become operational this year. The contract worth \$2.2 million is for an EAX 3 stored program controlled exchange switching 3,000 lines from General Telephone and Electronics Corporation in the US. It can be expanded to handle up to 60,000 lines.

## Egyptian contract

A \$1 MILLION contract for a natural gas distribution control and monitoring system has been won in Egypt by Westinghouse Brake and Signal of Chippingham, Wiltshire. The contract is in connection with the Abu Qir natural gas distribution project, and will include twin Digital Equipment PDP-11 minicomputers running the Westinghouse Wesdac software package.

## Conference in Canberra

CANBERRA is the venue of the Eighth Australian Computer Conference, which takes place between August 28 and September 1. The programme will include workshops and short courses, poster sessions, an exhibition and a personal computing session.

The extensive social programme includes visits to the Orrom Valley Tracking Station, the Snowy Mountains, and the Sydney Nolan Exhibition. The basic conference fee is \$140. For further details apply to the Eighth Australian Computer Conference, P.O. Box 448, Canberra City, ACT 2601.

## Fujitsu subsidiary profit

THE Australian subsidiary of Fujitsu, Facom Australia, came into profit for the first time in the year to March 1978, but still has a long way to go to wipe out its accumulated losses of \$A9.03m, which include a

\$A3.48m loss last year. The profit for 1977/78 was \$A6,072, and the company is not forecasting much more for the current year. Facom Australia did not reveal its turnover for the year, but it is believed to be seeking \$A12m.

Australian professional bodies know that those who hope to combat their larceny must match their skills with rather more than a few hours instruction.

The reality is that Australian police forces are inadequately staffed or trained for the task. But, even if Australian management did train their staff in computer security, would the Australian courts convict the criminals?

At a national seminar on white-collar crime a former director of the UN crime prevention programme said that Australian criminal courts were "grossly inadequate" in dealing with such crime, and he urged a change in the jury system to include technical experts. His argument is particularly valid in the cases of computer fraud.

Neither can foreign investors expect much protection from the Australian police. At a national crime seminar last year, delegates were told that more and more Australian criminals were turning to white-collar crime — in one State alone there had been an increase of 220% in fraud over the previous year, but the lack of technically trained staff rendered the state's police force powerless to deal with it.

The first seminar for police on computer crime was held last year at which 30 officers were given a five-hour lecture. The head of Sydney's fraud squad said: "In the end, we are going to have people specialising in computer crime."

But Australia already has people specialising in computer crime. Last year they stole an estimated \$A10 million, and

Most companies buying computers don't know what they are doing

Recent surveysshow that more than half of the companies buying computers have contacted only one manufacturer. This is strange, taking into account how large their investment is. Because we do not believe that anyone can be sure of the right choice without knowing what other firms can offer.

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first in the hard international competition. With the NORD 10/S, associated peripherals and software programs, we can offer flexible and economic computer systems for most data processing activities. A NORD computer system will never be too limited to meet new requirements. The initial installation can be extended as new demand grows. Give us a call and find out how we can co-operate.

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Denmark: Norsk Data A/S, Øverredvej 5, 2840 Holte. Tel. (02) 428555.

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England: Richard Norton (NORD) Ltd, NORD House, 17 Balle Street, London NW1. Tel. 01-2788501. Telex: 299832.

Norsk Data A/S develops, produces and markets NORD Computer Systems. The NORD systems have found extensive use in research and education, process control, data processing and networks. The application areas are continually increasing.



## Look what happens to cats Down Under!

THE latest thing to happen to cats in New South Wales is to have their pedigree registered on an ICL 2803 installed by the State's Royal Agricultural Society. The records are put on file with the help of Checkmaster, a real time animal registration package from System Aid of London. Checkmaster has also been used to register Australia's pedigree dog population, but in the UK crows have been the only customers so far. The Friesian Cattle Society uses it for its records. Here, Nick Waterhouse managing director of System Aid, and Felicity look at one of the certificates that the system produces for Aussie cats.

## NCR terminals for Victoria store

AUSTRALIAN department store group James McEwan has installed 240 NCR 255 point-of-sale terminals in 25 stores in Victoria. These are linked to an NCR 726 minicomputer in each store, and the company plans to form a network over dial-up telephone lines to a 192K NCR Criterion 8550 at its warehouse in Melbourne.

Value of the total system is about £1.5 million. Sales of each item are reported and the effect of price changes can be gauged quickly. Gross profit is reported weekly, and this avoids the laborious task of retail inventory.

The system also provides better cash control, credit checking and customer statistics, according to the company.



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## MARKETVIEW

Since Amdahl delivered his first 470V/6 processors three years ago, at least six other manufacturers have announced processors that can execute IBM 370 machine code, including no less than three new ones in the second quarter of this year. Is there a lasting market for IBM 370-compatible

processors from independent manufacturers? Can the demand support so many different competitors? Will they be able to follow IBM in price cuts as drastic as those that accompanied the announcement of the top of the range 303X series in 1977? What happens if IBM embeds more systems

software in microcode, or charges for future releases of its operating systems software? What sort of a growth path have the users of independent 370-compatible processors?

In this Marketview, Fred Lamond discusses the background to the current boom

in IBM compatible processors, and provides a guide to the systems currently distributed and supported in Europe, and those that may be in the future after an initial look at the North American market, and asks the question, "What will happen when IBM cuts its hardware prices to their level?"

# The IBM compatible processor market Is it boom or bubble?

THE idea of offering "compatible" hardware to the huge IBM user base is hardly a new one among competing manufacturers. Almost every minicomputer and terminal manufacturer offers IBM 370 data exchange compatibility today via 2780 and/or 3270 bi-synchronous communications protocols, if not IBM 3741 compatible diskettes or nine-track magnetic tapes.

Honeywell, ICL and NCR all offer general purpose computer systems that are data structure compatible with the IBM 370 range at some price performance levels, which usually carries with it a measure of Cobol and Fortran source program compatibility as well.

Even IBM Assembler compatible computer systems have a 16 year history behind them. Honeywell announced its 1400-compatible 200 series in 1962, and English Electric Computers and Siemens their 360-compatible System 4 and 4004 series in 1965. Siemens still manufactures the 370-compatible 7.000 series and has

been joined since 1973 on the European market by Univac with its Series 90. Philips also marketed the 380 Assembler compatible P1000 series on the Continent from 1968 to 1973.

All these Assembler-compatible systems have only implemented the IBM 360 and 370 user instruction sets, however, but defined their own "privileged" instructions to implement their own operating systems. Replacement of an IBM 360 or 370 system by one of these Assembler-compatible systems has thus always involved the user in converting all the JCL commands in his source programs to run on his new system.

This did not involve the user in any more effort or expense than a conversion from DOS to OS if he stayed with IBM, and was frequently easier. Both Siemens and Univac have thus scored most of their IBM user "knock-offs" among 360/40, 370/125 or 370/135 users who had outgrown DOS or DOS/VS multiprogramming capabilities, or among 360/20 or System 3

users attracted by the longer JCL-compatible growth path offered by both Siemens and Univac.

But users of IBM's medium to large systems who had already undergone the cost and effort of converting their source programs to an OS operating environment have mostly been unwilling to contemplate a

further JCL command conversion to another manufacturer's operating system for the sake of marginally cheaper hardware rentals or purchase prices. They were thus, until 1975, locked effectively into the IBM 370 processor range, even though they might still order their terminals and communications processors, and sometimes even their

peripherals and main memory extensions, from manufacturers other than IBM.

What Gene Armdahl pioneered in 1975 was a new degree of machine code compatibility: one that is no longer confined to the user instruction set but includes the privileged IBM instructions as well, and therefore allows user's systems to be run

under whatever operating system the displaced IBM 370 has been using. It also enables user object code programs to be executed unaltered even without any recompilation. Armdahl thus offered large IBM processor users, for the first time, a genuine alternative economic source of supply for their core processors.

Amdahl also pioneered a new degree of marketing specialisation. Instead of feeling obliged to incur the enormous R&D cost for a complete family of processors of all sizes and matching peripherals to compete against IBM, he has specialised in the manufacture and marketing of a large central processing unit and their memories; those of equal or greater power to the IBM 370/168 and so performance competitive with the IBM 3032 and 3033 processors. His CPUs are "socket compatible" with the IBM 370 processors, that they displace, so that his users can retain the IBM peripherals, or order peripherals from a plug compatible manufacturer.

Manufacturer	IBM	Amdahl	Fujitsu	Hitachi
Distributed and maintained in Europe by	IBM	Amdahl	Siemens	Itel
Equivalent models (Number of CPUs/system in brackets)	3033MP (2) — 3033UP (1) 3032 (1)	— 470 V/7 (1) 470 V/6II (1) 470 V/5 (1)	M200 MP (2-4) M200 (1) — M180 II (1-2)	— — — AS/6-7032 (1-2)
Operating systems	OS/MVS or OS/VS 1 or VM/370	OS/MVS or OS/VS 1 or VM/370	OS/IV-F4	OS/MVS or OS/VS 1 or VM/370

Table 1. Large and very large IBM compatible processors

## A CORAL CASE STUDY

An Oxford Medical Computer Centre project relies on CORAL 66 for its real time control software. The project is concerned with patient care administration and has planning and research data being produced as a by-product.

In the system each participating hospital is linked to a minicomputer running the patient administration system. A database on another mini contains summaries of patients case histories. The machines used are CTL Modular Ones for which RSRE wrote the original compiler. Visual display terminals provide direct access to the computer and the real time system permits information on patients to be updated as events happen.

Staff in the Patient Administration Centre enter patients details before they enter the hospital. Their admission, location, progress and discharge are entered as they occur. At any time, the system has case details of the patient but can give information for research or administration. For example, a bad status report allows the admissions office to locate spare beds at short notice.

Apart from aiding quick and efficient hospital administration the mini-computer system saves considerable costs yet provides a real time capability.

A special committee has been set up to safeguard confidentiality and one method of respecting privacy is the use of passwords for identification and authorisation.

"Caring with Coral"

## Training

Courses in CORAL 66 are regularly being offered by several organisations including CCGH, Forrester, GEC, NCC and SCL. NCC is now running the first time program design course which is fully developed for the CORAL 66 group. The course deals with structured programming, hierarchical design, synchronisation of parallel processes, module design and program quality, documentation and test strategy.

## MASCOT

A real time systems development and run time environment for CORAL 66 is on its way. MASCOT - Modular Approach to Systems Construction, Operation and Test - allows CORAL 66 programs to be broken down into independent parallel activities. The activities communicate with each other via local scheduled and controlled run time kernel. As well as providing excellent run time control, MASCOT allows parallel programs to be developed independently and to be formed into an executable system.

MASCOT development is being controlled by a joint industry - MOD group with major work packages being undertaken by software houses including CAP, Software Sciences Ltd. and Systems Designers Ltd. A MASCOT office definition has been issued and is available from RSRE. Commercial products using MASCOT should be available later this year and there is already a two year history of experience in proving MASCOT in defence real time applications.

A workshop on MASCOT is being planned for late 1978.

## USER GROUPS

The urge to meet and discuss the language has not passed by the CORAL community. The British Computer Society's CORAL 66 specialist group meets about every 6 months from September to May.

**CORAL**

Published by NCC on behalf of the Department of Industry, sponsored by CORAL 66

## By Fred Lamond

grated adapters and byte-multiplexer channel of an IBM 370/138 and 148. Both Magnuson, M-80 and National Semiconductor C400 main memory, for instance, can be expanded to a maximum of 16M bytes against a current maximum of 1M on the 370/138 and 2M on the 370/148. All competing medium size systems also offer field-expandability over a price-performance range where

IBM would require CPUs to be exchanged at least once.

Many consultants and IBM users are, however, asking how long can the IBM-compatible processor manufacturers maintain their advantage? What will happen to them when IBM cuts its processor hardware prices to their level, and/or announces new unbundled operating systems or extensions with sections embedded in firm-

ware microcode?

As far as the effect of IBM price cuts goes, we already know the answer. When IBM replaced the 370/158 and 168 processors by the almost identical 3031 and 3032 processors in November 1977, it priced these new models at less than half the price that it had charged for their predecessors until a year ago. It thereby brought their prices some 10 per cent below

the US prices of competing Amdahl and Itel models. But this sharp price cut caused a flood of orders for the new 303X processors from processing-power hungry users that IBM will be quite unable to satisfy out of its current production capacity in under two to three years.

While a few users have cancelled Amdahl or Itel orders for

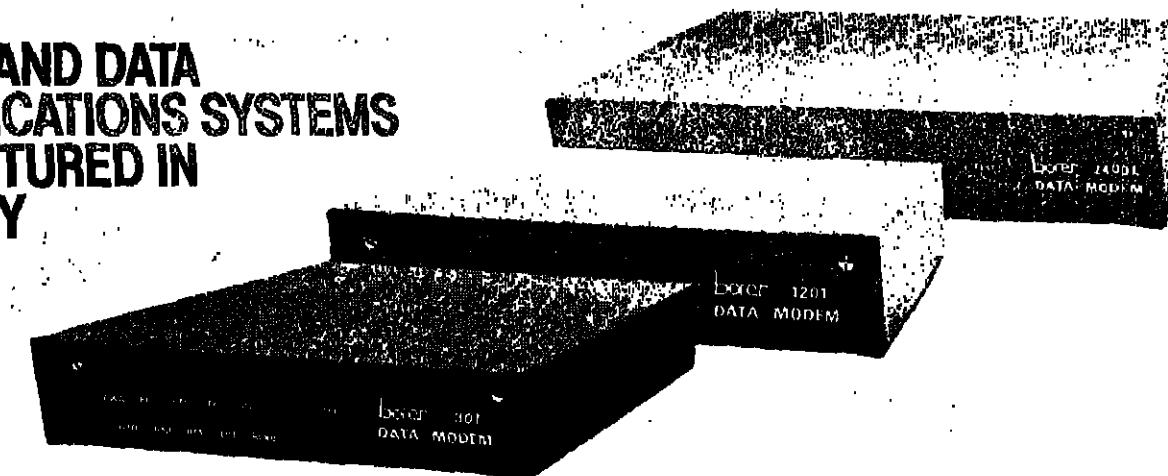
Turn to page 30

Manufacturer	IBM	National Semiconductor	IPL Systems	Magnuson	Two PI
Distributed and maintained in Europe by	IBM	(1) Itel (2)			CSS International
Equivalent models (Number of CPUs/systems in brackets)	3031 (1) 148 (1) 138 (1)	AS/6-7031 (1-2) AS/4 (1-2) [AS/3] C 400	— — —	Omega 480-II (1) Omega 480-I (1)	(M 80/5) M 80/4 (1) M 80/3 (1) CSS 3200 (1)
Operating systems	Any IBM	Any IBM	Any IBM	Any IBM	VP/CSS
Maximum main memory capacity on largest model in table (bytes)	6 M	8 M	16 M	2 M	16 M
Smaller models field-upgradable to larger models?	No	Yes AS/4 to AS/5	Yes	Yes	

Table 2. Medium to large IBM-compatible processors. Note: \*Model promised for announcement by the end of 1978.

## THE BRITISH CONNECTION

### MODEMS AND DATA COMMUNICATIONS SYSTEMS MANUFACTURED IN BRITAIN BY BORER



for the first time, a genuine alternative economic source for the supply of... central processors

rounded off their product lines with IBM-compatible processors, then their other competitors - Memorex, BASF and Storage Technology - will be fighting for the privilege to market the Magnuson M-80 series in Europe.

The rapid development of this IBM machine code compatible processor industry has been due to the same reason which prompted the earlier growth of IBM-compatible peripherals: manufacturers from 1965 and of PCM memory manufacturers from 1969, ie a growing gap between IBM technology and prices and possibilities offered by the latest state of the art. Current IBM processor models are but little altered variations of late-1960s designs first announced in early 70s.

In the case of the top of the range 370/158 and 168, their price gap had become all the wider as IBM had actually raised their CPU prices - by 40% in 1972 when they replaced the little different 370/155 and 165, and a further 15% at the beginning of 1975 when the 370/158-3 and 168-3 replaced the earlier 158-1 and 168-1.

All the processors offered currently by Amdahl and his six imitators use more highly integrated and, therefore, more compact and less costly LSI or VLSI components and memories than the IBM 370 and 303X processors against which they compete.

The medium-size National Semiconductor C400, Two PI 3200, and Magnuson M-80 processors use a high-speed microcomputer bus architecture which makes it much easier to expand their main memories and/or connect a greater number and variety of micro-processor driven I/O subsystems to them than to the inte-

## Modem Range

Borer modems span the speed range up to and including 4800 bits per second. A vast range of facilities and options is available.

## Borer... more than just modems

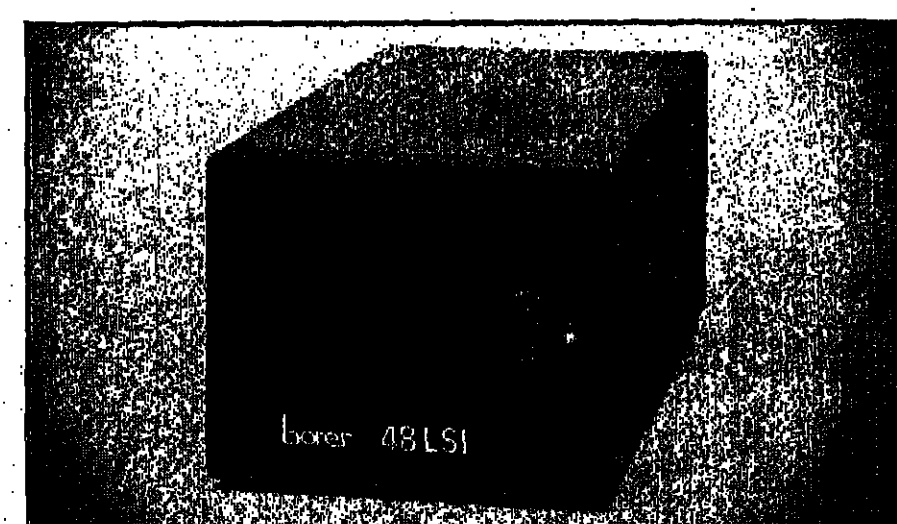
All modems include loop and test pattern facilities to assist in fault isolation. The 48LSI uses an advanced constellation for superior performance at 4800 bps. The Multidrop version, 48LSI-M, provides reliable multidrop and dial up facilities with 25 ms turnaround time. Even the 301, our 300 bps 2-wire modem, can self test in audio loop.

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Hesh Wiener talks to Gene Amdahl about the way he is planning to improve the performance of the Amdahl systems

# Amdahl says the 470V/7 will be 10% faster than announced speed

HOW fast will the 470V/7 be when it is shipped next month? "More than 10 per cent faster than the announced speed," says Dr Gene Amdahl—and possibly significantly faster than even that.

Accepted by most observers as the fastest general-purpose computer in the world, the 470V/7 will leave Amdahl's Sunnyvale, California factory with nearly twice the power of the company's 460V/6, easily twice the speed of an IBM 370/188, and, depending on the way you measure things, as much as 50 per cent more than IBM's most powerful processor, the 3033.

The improvements in the computer's design will not delay first customer deliveries.

"We announced that we would ship in August," recalls Dr Amdahl, "and we'll probably ship the computer at the end of that month. We will use all the time between now and then to improve the limiting critical paths."

So far, the effort to locate bottlenecks in the computer system and eliminate them, has paid off. The improvements in performance will come without any penalties in price, reliability or ease of use. The search for further enhancements to the machine continues on a daily basis.

First, Amdahl Corp personnel fire up the machine and load it with work that typifies the mix of problems users will be solving. Then, engineers monitor the various paths information takes through the machine to see where any time might be gained by redesigning a circuit. Finally, the changes must be implemented and further testing done. There is no certainty that an improvement in one function will actually improve the system's performance.

Amdahl explained the process using hypothetical examples.

"It could well be that the middle bit of an address path involves a time consuming test to see if you are crossing some boundary in the machine. That might be the critical path, the thing that takes longest to do. So you redesign that, and it is no longer the critical path. Now perhaps the critical path is when the data comes out of the cache and you have to check to see which of several items is the one you want. So you redesign that part of the system."

Not only must the computer run a three-ring circus of parallel processes; it must simultaneously monitor its every function in the event of some failure.

To maintain customer confidence, the Amdahl computers not only have to run faster than anything else in the world; they have to run more reliably, and if they break down, they must help technicians with the repair process. It was only by exceeding every industry standard that Gene Amdahl could sell his first offerings, and it will be through continued leadership that he keeps the queue of customers lined up at his front door.

For Amdahl Corp, the advantage of selling computers that run IBM software is accompanied by a risk: should the company fail to deliver computers that meet or exceed customers' expectations, users can switch back to IBM without much difficulty.

The risks of mainframe ventures may also be increasing because prices have been falling rapidly and will continue to drop. When Amdahl first went into business, the IBM price umbrella was a lot bigger than it is today.

IBM has controlled the mainframe market since the announcement of the System 380 and, Amdahl believes, this has enabled the company to keep prices relatively high.

"They have not reduced prices with the (changes in) technology, and at this time we can consider most of the computer market essentially to be starving."

"It's an elastic market so far. It may get satiated, and the market size could drop, but it's going to end up at a much higher level than it has been in the past."

But the rapid pace of technological progress has led several vigorous competitors into the fray during the past year. Price wars could occur, as they have in other markets for electronic equipment.

"We may find," observes Amdahl, "that the revenues might not grow because prices are coming down and the elasticity might not be quite high enough." Thus far, the history of computing demonstrates that reduced prices result in greatly expanded markets. Nevertheless, no market remains perfectly elastic as it grows, and industries inevitably mature.

## Wall Street calm

THINGS have been pretty boring on Wall Street. The stock market has no clear direction and the stock analysts, puzzled by the recent decline in the market after some sharp rises, have yet to explain fully investors' indifference.

With no crises on their minds, the financial analysts seem lost. They have even become tired of complaining about the seeming hypocrisies of the Carter Administration. Interest rates have moved upward and inflation shows no sign of abating.

Beneath this calm surface, however, there are some indications that investor confidence in the computer business is not as great as the order backlog that most vendors claim to have.

Digital Equipment, for example, which has had its share of trouble on Wall Street, has been suffering further the erosion in its stock value. At a time when the company may need to raise funds for expansion, this does not bode well.

Honeywell, which only gets about half its revenues from computers, is another company that may be hurt by present economic conditions in the US. Construction, sensitive to interest rates, is falling. Housing starts are off quite a bit and are expected to continue to slide and with that goes the growth of Honeywell's large business in heating/cooling system components. This may explain some of the change in short interest in Honeywell stock.

Whether or not the growth of the computer industry slows during the next few years, Amdahl Corp, like its rivals, must continually seek improvements in its systems. The company is hoping to build faster and more dense circuits during the coming years. Amdahl is also working on a way to improve

markedly the design of its channels, which today are functionally identical to IBM's.

The channel improvements will involve, according to Amdahl, "paired streams of I/O." Today's channels cannot reverse very rapidly, and thus, at electroic speeds, they seem to be one-way paths, which limits the

use of mainframes in certain applications. A channel that could move data in two directions very rapidly would permit interactive links between computers and peripherals.

Amdahl cites banks' check-processing machines, where "a stream of information is coming in and it must be compared to

something in memory, which then causes other information to be sent back out," as a good application.

A channel that can switch directions may also perform the functions the present IBM compatible channel offers, it the new functions simply enhance the industry standard.



"We can consider most of the computer essentially to be starving."

# Call for world alliance on transnational data flows

THERE is growing concern throughout the world about the effect of transnational data flows but most countries have spent too much time identifying, rather than solving, the problems.

That was the view expressed by Gustaf Adolf Westman, head of the Swedish Data Inspection Board, at a three-day conference in Washington, organised by Information Gatekeepers of Brookline, Massachusetts.

Although the conference featured speakers from the US, Sweden, France, Germany and the UK, it was left to Dr Peter Robinson, chairman of the Canadian government's inter-departmental Committee for Computer/Communications, to

provide the only attempt at trying to quantify the problem.

Using data published earlier this year by his government, Dr Robinson pointed out that computing services imports to Canada totalled about \$155 million in 1975, a value which represents about 30 per cent of the services obtained by Canadian users from outside their own data processing operations. "If present trends continue," he said, "imports of service will reach some \$560 million by 1980, about 41 per cent of outside services, and increase to some \$1,500 million by 1985, about 52 per cent of outside services."

"It is not very likely that we will be able to offset this growth in imports by greater exports

from Canada," Robinson added.

The growth in services imports will have a detrimental effect on Canadian job opportunities, he added. The government study indicated that the number of jobs created outside Canada to meet the country's requirements amounted to about 4,400 by 1975, or some 4.5 per cent of the DP-related jobs in Canada at that time.

By 1980, Canada predicts, that number will swell to some 11,000, or about 8 per cent of Canadian jobs, and by 1983 to about 23,000, or about 14 per cent of jobs.

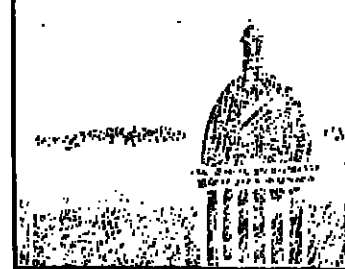
At the same time that Canadian computing is being displaced, Dr Robinson noted, user demands are increasing. Users

spent an estimated \$2,700 million to obtain computer/communications goods and services required in 1975. These costs are expected to rise from the 1975 level to about \$5,600 million in 1980, and to some \$9,500 million in 1985.

To further exacerbate Canada's problems, Dr Robinson said, there is growing concern about the storage of personal data on Canadian citizens outside the country, and particularly in the US. Quoting from a report prepared by the government's Task Force on Privacy and Computers, Dr Robinson touched on an area that is very "sensitive" to Canadians. "As a sovereign state, Canada feels some national embarrassment and resentment over increasing quantities of often sensitive data about Canadians being stored in a foreign country."

The Canadian government feels it is time to act on these problems, Dr Robinson said. "But what form new restrictions, if any, might take, and to achieve what objectives are by no means clear."

John Eger, a Washington attorney and communications consultant, said that the American public "abhors" regulation, partly because the public has little faith in the federal government to solve problems. But at the same time as the US is



pushing towards de-regulation, he contended, other countries are becoming more regulated. "America needs to awaken to the realities that we alone have not come to grips with a national information policy, a trade policy or even a transborder data flow policy," Eger asserted. He also appealed to all nations for "an alliance in world policy" regarding transnational data flows.

A similar appeal was made by Dr David Becker, director of science, technology and industry for the OECD in Paris. "There is a very small step between data protection and data protectionism," he said. In his plea for greater harmony among countries, Dr Becker urged each nation to strive for the former and avoid the latter. "It is impossible to overstate the importance that this be done," he said.

## 'Information quality council' demand

WITH the completion of the first five of an expected 10 task force reports comprising the US Federal DO Reorganisation Study, one message comes through loud and clear: the management of the government's information technology resources is seriously deficient.

The first five draft reports came from teams that studied the DP environments of standards, personnel, small federal agencies, human resources programs, and acquisitions. The remaining task force reports, which will filter out before the end of the summer, deal with DP in general government, national security, science and technology, operational management and central policy.

The human resources team, which was charged with finding ways DP could improve the government's delivery of human services, took on the added task of chastising the government for commissioning redundant studies that serve no greater purpose than to collect dust in bureaucrats' offices.

While the other four task forces politely acknowledged in their reports that numerous other studies already existed, they nonetheless proceeded to re-identify, re-verify and reference previous findings. The human resources team was the only group to come to grips with the issue of redundancy. It said the President should declare a moratorium on further duplicative studies while the government "consolidates the best of what has already been done" and takes action.

"Most of the previously published reports are excellent, in agreement with respect to findings and, where there was commonality of scope, largely in agreement with respect to their recommendations," the group charged.

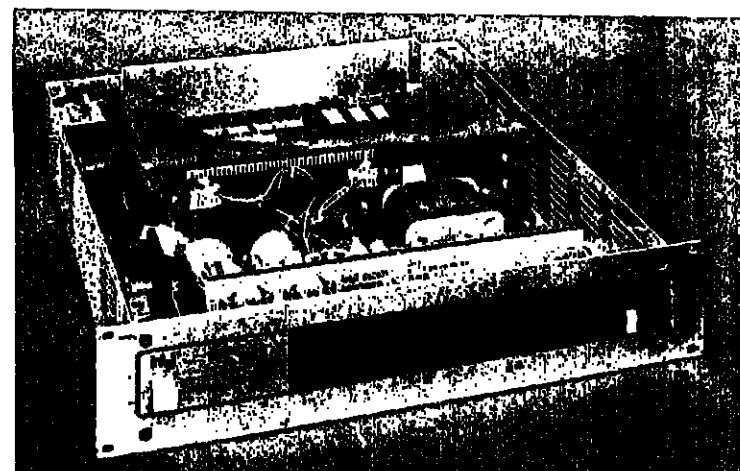
As a long-term solution, the team urged creation of a President's Council on Information Quality, which would operate as an arm of the Executive Branch.

The personnel report stated that the process of examining and certifying a candidate through the Civil Service Commission is overly time consuming and involves too much "red tape." Salaries for entry level DP personnel are \$2,000 to \$3,000 lower in government than in private industry. Job candidates have no central place to visit to determine what positions are actually available. Also, the obsolescence of many federal DP systems adversely affects the government's ability to attract DP personnel with state-of-the-art experience and background.

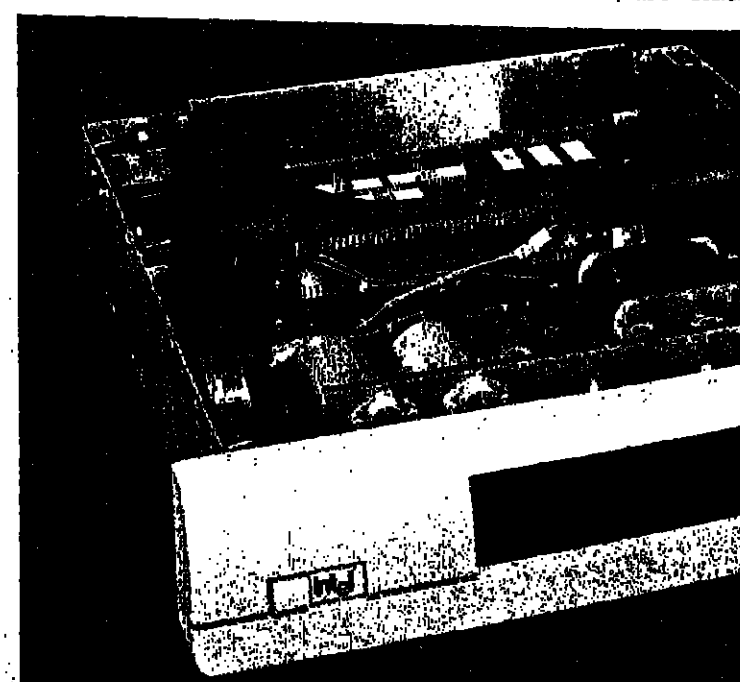
Moreover, the personnel task force complained, "There is no consensus within the federal government on where data processing should be placed organizationally, nor what role it should play in the management scheme of things." Since DP personnel are frequently overlooked when top management positions are open, the team claimed, the government's ability to recruit and retain competent DP people is severely hampered.

The lack of accountability for the success or failure of DP procurements was a pet peeve of the acquisition task force, which noted that private industry would never tolerate such a situation.

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**SYSTEM 80/10** The System 80/10 is a fully packaged microcomputer utilizing the ISBC 80/10A Single Board Computer. Ideal for the OEM whose design requires low-cost 19" rack mountable packaging, the System 80/10 offers easy to use, fully programmable I/O, the computational power of the Intel 8080, and is fully compatible with Intel's ISBC 80/10A, with both RAM and EPROM memory. The enclosed power supply is designed to support not only the Single Board Computer, but also a full complement of additional slots for expansion boards. The chassis houses the computer, power supply, fans, and has three additional slots for expansion boards.

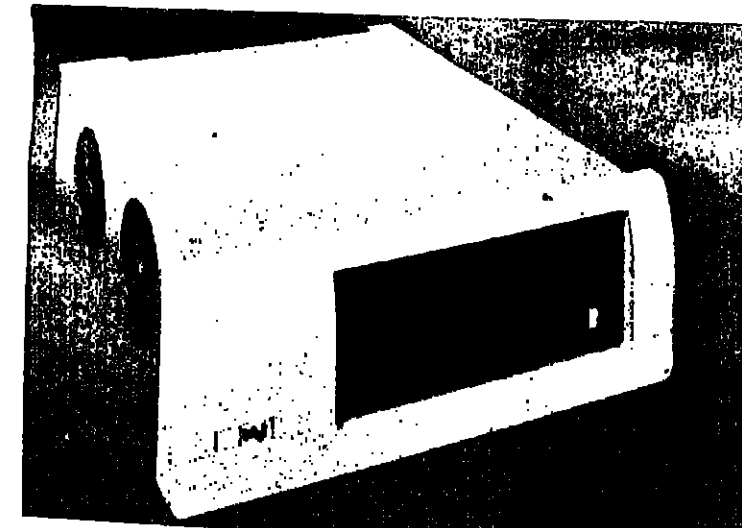


**SYSTEM 80/20-4** The System 80/20-4 is a fully packaged microcomputer utilizing the ISBC 80/20-4 Single Board Computer. Ideal for the OEM whose design requires low-cost 19" rack mountable packaging, the System 80/20-4 offers easy to use, fully programmable I/O, the computational power of the Intel 8080, and is fully compatible with Intel's ISBC 80/20-4, with both RAM and EPROM memory. The enclosed power supply is designed to support not only the Single Board Computer, but also a full complement of additional slots for expansion boards. The chassis houses the computer, power supply, fans, and has three additional slots for expansion boards.

Real-Time Applications served in the market sectors to date are:

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- ISBC 116 16K byte RAM, 8K byte PROM, 48 programmable I/O lines, UART
- ISBC 310 High Speed Math Unit
- ISBC 416 16K byte PROM
- ISBC 501 DMA Controller
- ISBC 508 32 input lines, 32 output lines
- ISBC 517 Combination I/O Board
- ISBC 518 Programmable Parallel I/O Board
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### ISBC 666 Optically Isolated I/O Board

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- RMX/80 Real-Time Multitasking Executive

The nuclei of Intel's OEM Computer Product Line are the ISBC 80 Single Board Computers and System 80 Packaged Systems. Each Intel Single Board Computer provides all the resources of a full computer (i.e., CPU, Read/Write Memory, Read Only Memory, Parallel I/O, and Serial I/O) on a single PC board. The System 80/10 and 80/20-4 extend these capabilities into low cost, fully packaged, rack-mountable computers. The Intel Single Board Computers and Systems are supported by a complete line of memory, parallel and serial digital I/O, analog I/O expansion boards, and peripheral and DMA Controllers which are all compatible with the standard bus... the Intel MULTIBUS. Prototyping packages, modular backplane/cardcages, power supplies, and chassis are also available to simplify product development. Intel's RMX/80 Real-Time Multi-Tasking Executive with diskette, file system, terminal driver, analog driver, high speed math unit driver and debugger have been designed and optimized specifically for the ISBC 80 series. The OEM Computer Systems products and Intel's Microcomputer components are supported by the most advanced system development tools available today. The heart of these development tools is the Intel Microcomputer Development System, its In-Circuit Emulators, and its complement of advanced development software. Software packages available for use directly on the Intel System include a resident relocatable and linkable macro-assembler, a text editor, operating systems, and utility programs. RLM, the high-level programming language Intel specifically designed for 8080 based systems, is also available resident on the Intel system. The PL/M-80 compiler provides the capability to program in a natural, algorithmic language, and simplifies the need to manage register usage or allocate memory. PL/M-80 program modules are relocatable and linkable with other language program modules.

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PA COMPUTERS AND TELECOMMUNICATIONS

Donald Kennett reports from Italy

# International nature of Honeywell's Series 60

THE international nature of Honeywell's Series 60 range of systems is highlighted by the enhancements that have been introduced for the Level 62 (CW, June 29). Level 62 was designed in Italy and is being produced at a factory in Caluso, near Turin, with 80% of the production exported.

Level 61 was designed in France, Level 64 in France and the US, and Level 66 in the US. The UK also participated in the software design for the series and manufactures Level 66s in Scotland (CW, April 25, 1974).

Manufacture of Honeywell computers takes place in Newhouse, Strathclyde, the US, France as well as in Italy. The Italian operation has offices and a research establishment in Milan, and a production plant at Caluso.

Honeywell Information Systems Italia markets all Honeywell products in Italy, Iran, Turkey and Yugoslavia. The Caluso plant produces Level 62 computers, serial matrix printers and magnetic tape transports for the company's world market.

The oldest of these lines is a tape cassette deck that started production in 1973 and has reached a total of over 10,000 units produced. For sheer numbers, though, this is exceeded by the serial printer, which, although it is the newest product, has reached a total of 14,000 since 1975.

These are being produced at a rate of 300 a week, but the aim is to increase output to 2,000 a month. This compares with a figure for Level 62 processors of 80 per month. The

reason is that this printer has found a home with Honeywell's whole range of mainframes and minis and also sells to the OEM market.

This is because it can be configured as a console printer, a local or remote terminal or output printer and has a choice of 30 keyboard versions and a 50 character sets.

The Level 62 itself has four models, the 62/20, 40, 50 and 60 ranging in price from £45,000 to £250,000. Differences between them include size of memory, amount of automatic error correction, timing and firmware.

Since production started in 1974, changes have been made to keep up with latest technology. From starting with TTL and 1K memory chips Level 62 now makes use of 16K memory chips and other LSI devices so that at 80K bytes, the current basic system memory exceeds the original maximum. The maximum has recently been extended to 512K bytes.

HIS employs 3,700 out of Honeywell's worldwide total of 95,000 staff. It has 55 field engineering offices spread throughout Italy but the biggest concentration of people is in the north, with 1,200 at the Caluso production plant and 550 at the R&D centre at Pregnana near Milan.

At the research centre half the designers and engineers are graduates and they use 22 Level 62 systems in their development work, making it the largest computer centre in Italy.

The Level 62 was designed and developed there, as was the G100 series before it, and the team has over 500 patents to its credit. Patent licences have been sold to the US and Japan, with Japan starting to manufacture Level 62s under licence.

Research work goes on in collaboration with universities and this is a pattern kept up since the company's forerunner Olivetti first started work with Pisa University in the early 1970s on Italy's first computer, the Elea.

Current collaboration includes software engineering

with Milan and Salerno universities, medical applications with Florence and Pavia and disc drive design with Bologna.

Five international software houses have also had people working at the research centre in co-operation with HISI.

The production workforce of 1,080 at Caluso has an average of 10 years' service in spite of two changes of ownership in the 15-year life of the plant. The average age is 35. About half the number is technician grade and seven per cent are graduates.

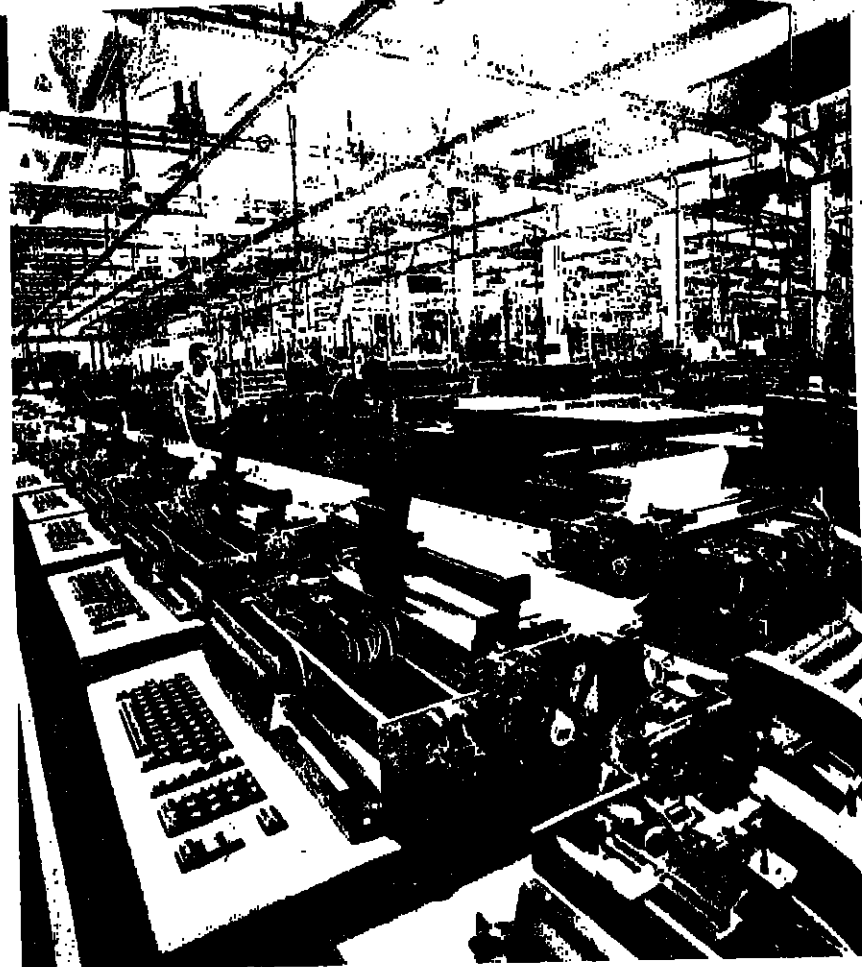
The plant uses a number of automated processes including numerically controlled and multiple drills, programmable component sequencing machines, automatic insertion of chips and discrete components and automatic backplane wire wrapping.

Names on these machines include Graziano on the NC drills, Plurima on the multiple drills, Behrens on the punch presses and Gardner Denver on the wire wrap machines, but several automated processes have been developed by the company and based on the last product line, the G100 series computers. Four are used, for example, on backplane testing and component sequencing.

Current development involves using Level 62s in the automation process and for a terminal network providing online information.

Customers in manufacturing industry already use Level 62 in their internal networks, the biggest being Olivetti and Fiat. In fact manufacturing industry is the largest user of Level 62, accounting for 37% of Italian installations. Next largest groupings are finance, distribution and central and local government.

HISI is the only computer firm in Italy fulfilling all the supplier functions of R&D, manufacture, marketing and service. It counts over 2,000 general purpose computers installed and maintained. This is 70% by number and 22% by value of the Italian total and second only to IBM.



The assembly lines for dot matrix serial printers at Honeywell's Caluso factory, near Turin.

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Studies University  
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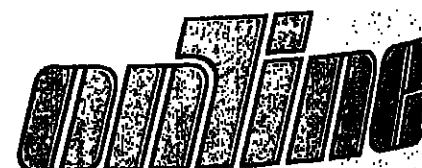
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Automatic insertion of components on printed circuit boards (bottom right) at Caluso.

Spain is soon to become a serious contender in the DP stakes. But rather than taking on established markets in Western Europe and North America, Spain is looking to the Middle East, Latin America and Eastern Europe. Here Ivan Berenyi spotlights the activities of Secoinsa, a consortium financed by the Spanish

government, the telephone company, banks and a local components manufacturer.

Set up three years ago by government decree, its brightest spark is the Series 30 computer system which is aimed at the same market segment for which the IBM System 3 and the ICL 2903 were designed.

# Spain bids to set up its own DP industry

By Ivan Berenyi

THE opening of a purpose-built factory in Malaga by the Spanish company Secoinsa later this year will mark a new step in Spain's attempt to establish a viable indigenous computer industry.

The factory, on the Guadalupe industrial estate, will be making the Series 30, a small business machine, and the scientific/industrial Series U models, as well as a range of terminals and modems.

Both the Series 30 and the process control-oriented Series U have been designed for Secoinsa by the Japanese manufacturer Fujitsu, which has a 28% stake in the company, making it the largest single shareholder. Other main shareholders are the Spanish industry ministry through its Instituto Nacional de Industria, INI (analogous to the UK's National Enterprise Board) and the telephone company CTNE. Both hold 25% of Secoinsa, the balance being made up by nine Spanish banks and local components manufacturers Pihier.

The Series 30 is the brightest spark of life yet shown by Secoinsa — an acronym for Sociedad Española de Comunicaciones e Informática — since it was created by government decree three years ago.

Now the first fruits of the government's policy are beginning to emerge. Last year saw the introduction of the Secoinsa 35, a disc-based minicomputer from the Fujitsu design stable; the Series 30, designed to compete in the IBM System 3 and ICL 2903/4 sector, will go into production late summer or early autumn; and the Series U, about which little is so far known, will follow next year.

The relationship between Secoinsa and Telesincro is confusing. Officially they are merged, with Secoinsa holding a 67% stake in Telesincro — the minimum controlling interest under Spanish fiscal law. But some effort is being put into preserving the separate identity of Telesincro, for legal and tax reasons Secoinsa says.

The result is that the majority of employees, including almost all sales staff, are still contracted to Telesincro and paid from Barcelona, though they are expected to handle products bearing either name. Only staff hired by Secoinsa since the merger are strictly employees of the parent company.

"We all belong to the same group — it's just one company with two arms," explained Señor Juan Carlos Montero Vargas-Zumiga, Secoinsa's director with responsibility for exports.

Nevertheless there are signs that rationalisation is not yet complete. The Series 10/4, cur-

rent model in a family of small business systems designed and made in Barcelona under the Telesincro name, also turns up as the Secoinsa DF-4 — something that image-conscious Spanish customers find puzzling.

Geographical factors cannot have helped in the merger so far: the group's two manufacturing locations could hardly be further apart. The Telesincro operation is based on a plant in Barcelona's Calle Rocafort, employing about 550 people; Secoinsa currently occupies a temporary building in Malaga, employing 95, while it awaits completion of its new factory in the same city. Group headquarters are in Madrid, about equidistant between the two plants. But this apparent initial drawback is intended to be turned into an advantage, in due course, in building up a dense network of sales and service locations nationwide.

The Secoinsa plant in Malaga currently makes only terminals and modems, but because the opening of the new factory has been delayed it is likely that production of the Series 30 will start in the temporary building and be transferred towards the end of the year.

Two ranges of terminals are made in Malaga — stand-alone banking terminals and simple keyboard machines. The influence of the Secoinsa shareholders is apparent, the banks being a captive market for the first product line, and CTNE a major customer for the second.

The modems — 2,400 and 4,800 baud machines — are also largely destined for CTNE, which will lease them to telecoms customers and users of its Red Nacional national data transmission network.

Production at Malaga started last July, and by the end of the

year 40 banking terminals and 1,200 modems had been built. Target figures for the first six months of 1978 were set at 80 banking terminals, 1,300 modems and 150 keyboard terminals.

By the end of 1979, ambitious target figures are 3,200 modems, 200 bank terminals, 300 keyboard terminals, 300 online teller terminals for banks, 200

Series 30 has a 670 nanosecond LSI main memory expandable from 24K to 224K bytes. This is backed up by virtual memory configured in 512 byte modules.

Microprogrammed modules are said to be available for a number of control, scientific and communications applications. The operating system is called Unios/F2, and the machine can be programmed either in Cobol

Until recently Secoinsa was scarcely more than a layer of bureaucracy imposed upon the old Telesincro company of Barcelona.

France's Plan Calcul provided the original inspiration for the setting up of the company and, somewhat oddly perhaps, the creation of Cuba's Centro de Investigacion Digital. The prime propagator of a Plan Calcul-type approach was Señor Claudio Grino Ramos (pictured left) a pharmacist who had been nominated Consejero Director General of Telesincro in 1973, but has since left the Secoinsa fold.

Secoinsa Series 30 computers and 110 Series U machines.

Brochures are already in circulation among potential Spanish customers for the Series 30, although the first machine has yet to be built. Neither Secoinsa, nor Fujitsu is keen to talk about the origin of this system, but it appears to be a new development for Secoinsa rather than an adaptation of an existing Fujitsu machine.

According to the brochure the

or Fortran as well as a low-level language called Taskforce.

Peripherals for the Series 30 will be made in Barcelona and include 243K byte diskettes (almost certainly the same units that are currently supplied for Telesincro's Series 10/4), up to 320M bytes of fixed-head or exchangeable disc storage, 282K byte magnetic tape units, 800 bpi cassette tapes and a series of printers from 45 cps to 340 lpm. A choice of keyboard/

printer or video terminals will be available, the terminals to be made in Malaga.

The System 30 will join the similar but smaller System 35, Telesincro's existing Series 10 minicomputers (based on a 32K to 64K RAM with a limited choice of peripherals including cassette tape, low-speed printer, fiche unit and — at maximum configuration — diskette) and the Telesincro Iber 2, a database-oriented minicomputer designed for online applications like stock control and small-scale reservations systems.

The Iber 2 which Telesincro's latest adverts say is "the machine that converses in Castilian", is the Catalonia-based company's newest model in the long-running "Factor" range; itself launched at the "15 Simo" exhibition in November 1975, its earliest predecessor was the Factor P, first marketed in 1967.

The P was followed by the Q, R, S, S3050 (in three configurations), T models and the Castor Series of the Factor line.

Of the Secoinsa Series U little is known except that it will serve real time needs and will be available in four configurations from U-100 to U-400.

Secoinsa's development programme is clearly bottom-up rather than top-down, which is realistic in view of its lack of direct government support and the competition from IBM, Univac, Fujitsu itself, Honeywell, Bull and, increasingly, ICL.

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in 1973 but has since left the Secoinsa fold.

Today export director Juan Carlos Montero warns against drawing too close a comparison between the Secoinsa effort and Plan Calcul. "Secoinsa is a private company, not a government-sponsored outfit," he pointed out. "OK, there is a partial government ownership through INI, but even if you put the holdings of INI and CTNE together, they come to less than 60% of the total."

"We are in the same position as any other computer products supplier in Spain. There are no import duties levied on computer manufacturers here, so we have to compete on equal terms with the IBMs and Univacs. Our prices have to be very competitive."

Last year the group's turnover of domestic sales was around £6 million. In addition there was some export activity to Portugal, where Secoinsa has a sales office.

Secoinsa's commitment to exporting is firm but selective. "As a Spanish company we obviously enjoy linguistic and other advantages in Latin America, and this is our prime export orientation," said Montero.

"Of the four initial countries, Mexico and Argentina have the highest technical level, in Chile we have good contacts and in Venezuela there is plenty of money but not so much technical sophistication."

But the company is also looking south and east. Three Arab countries — Egypt, Iraq and Algeria — are to be used as pilots for a Middle Eastern and North African export presence.

Secoinsa is currently studying the possibility of setting up a joint Spanish/Egyptian regional HQ in Cairo to provide sales, systems support and maintenance. This, Montero felt, would help overcome the language problem which might otherwise be prohibitive. In Eastern Europe, which Montero considers another area of potential interest, initial co-operative talks have taken place with the Soviet Union.

Western Europe is to be ignored though. "The European market is too strong, and to break into it needs too much investment in our terms," Montero conceded.

"We have not even given a serious thought to official participation in events like the Hannover Fair or Sigco, albeit some of our people from the R&D and product divisions tend to go to have a look around. We are not interested in Europe outside Spain and Portugal, we prefer to focus all our efforts on these areas."



The Secoinsa Series 30/5, a small business system (left), and Telesincro's Series 10/4 which also appears under the Secoinsa label as the DF-4.



A model of Secoinsa's purpose-built factory in Malaga, due to be opened later this year.











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Gerry Naylor, Area Sales Manager,  
Atkins On-Line,  
Regency House, 101 Hagley Road, Edgbaston,  
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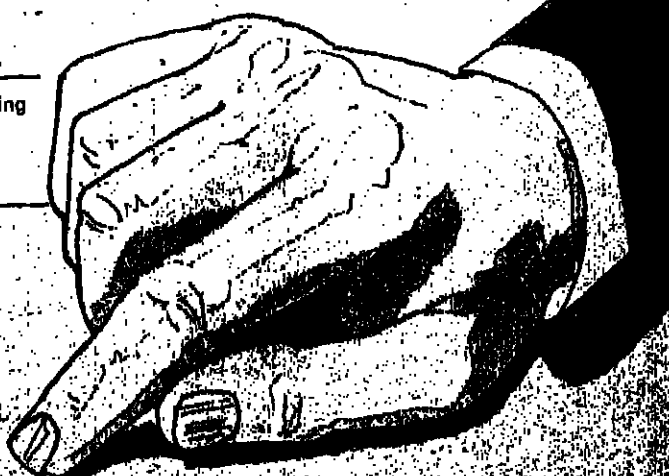
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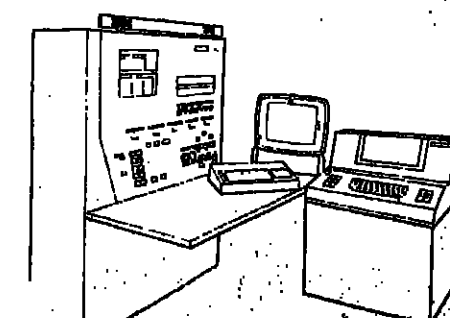
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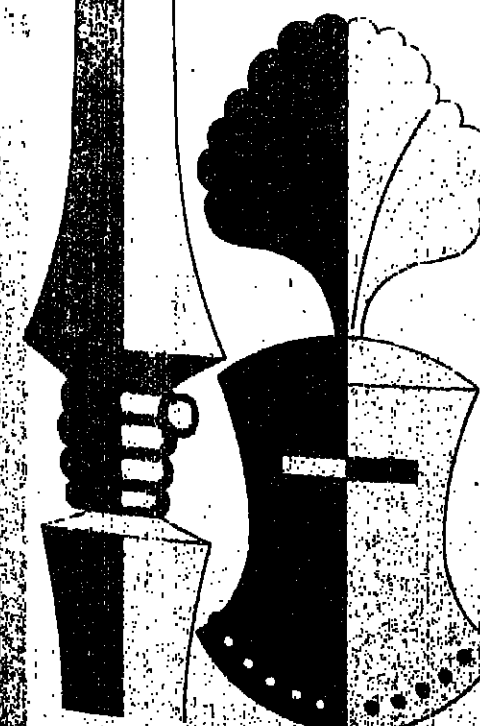
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Computing  
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in the Centre, and for two  
**SYSTEMS PROGRAMMER**

posts. The University computing services are based on a DEC 4000 system, two PDP11s, a CIL computer for use in the 15,000 books held in the Keble West University Computer Library. The Centre has considerable experience in both systems and applications in education and in the development of computing facilities for the new

Library. Salary: Deputy Director: £7,074-£8,750 per annum. Systems Programmer: Grade 14/15: £2,800-£7,200 per annum (plus pension) for all 15/16/17/18.

Application forms and further particulars from the Librarian, The University, Keele, Staffs. SKE15 5TA. Closing date 15th August, 1978.

## OPERATORS

**TWO IBM DOS/POWER/GRASP OPS.**  
One year's experience. City and Middlesex - Surrey. Benefits include car and pension (first four). 1. excellent prospects. **£4200-**

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Phone Reading 583455

**WINDSOR**  
Castle Hotel  
High Street  
Windsor  
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1. Experience in writing and developing operations software for mini computer hardware is essential.
2. Assembler programming experience or equivalent type low level language essential.
3. You will be expected to work on the development and programming of the machine software as well as becoming involved in a certain amount of systems design.
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5. Any experience of communications software will prove valuable.

These are permanent positions and relocation expenses will be paid.

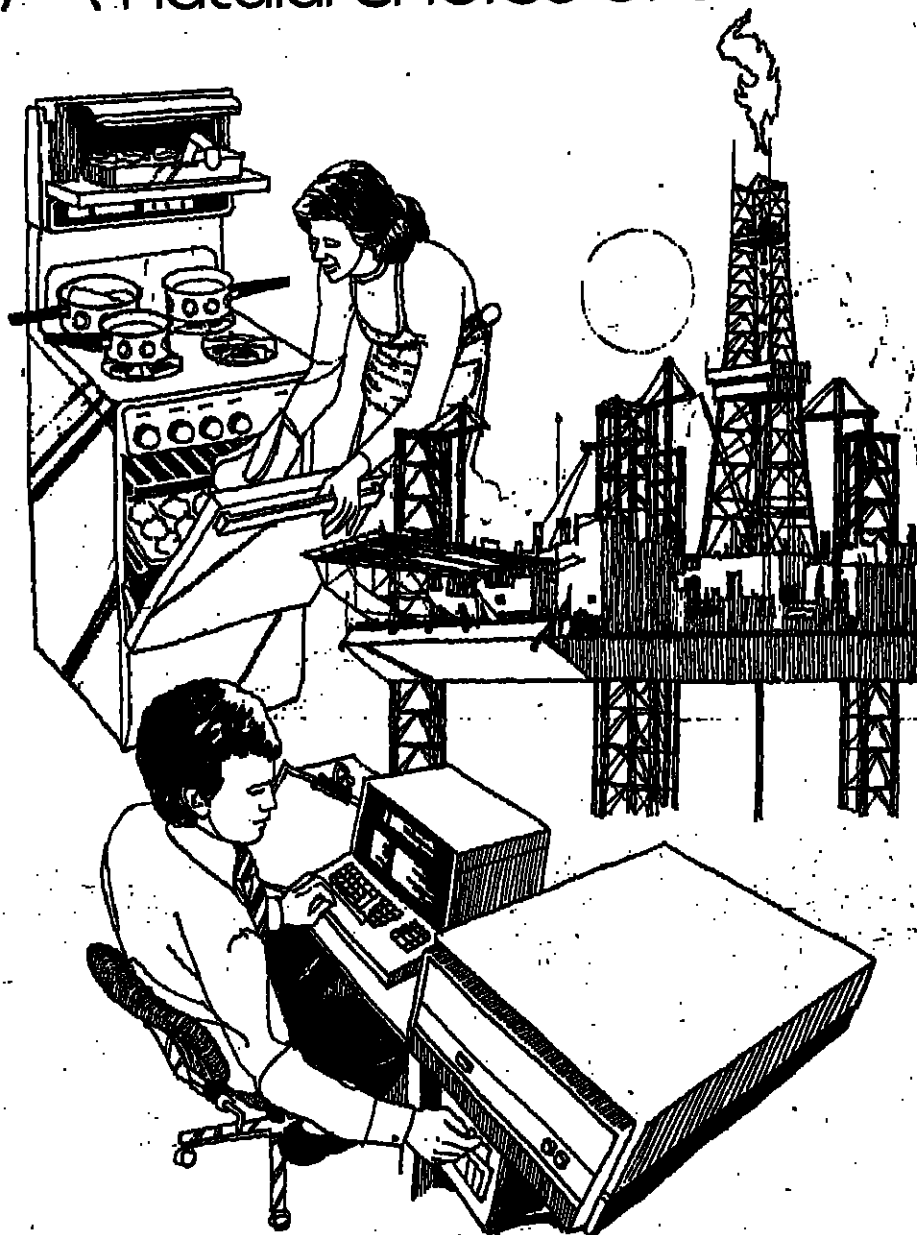
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Jeff's list



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## North Thames Gas-

Employs nearly 13,000 staff and provides a service to 1.86 million domestic, commercial and industrial customers throughout 24 densely populated Boroughs covering 1,000 square miles. We advertised recently for staff to work at the Development Centre in Acton. Continued growth and future plans mean we need more computer professionals to take up challenging and rewarding career opportunities at our Regional Computer Centre in Staines.

## Regional Computer Centre-

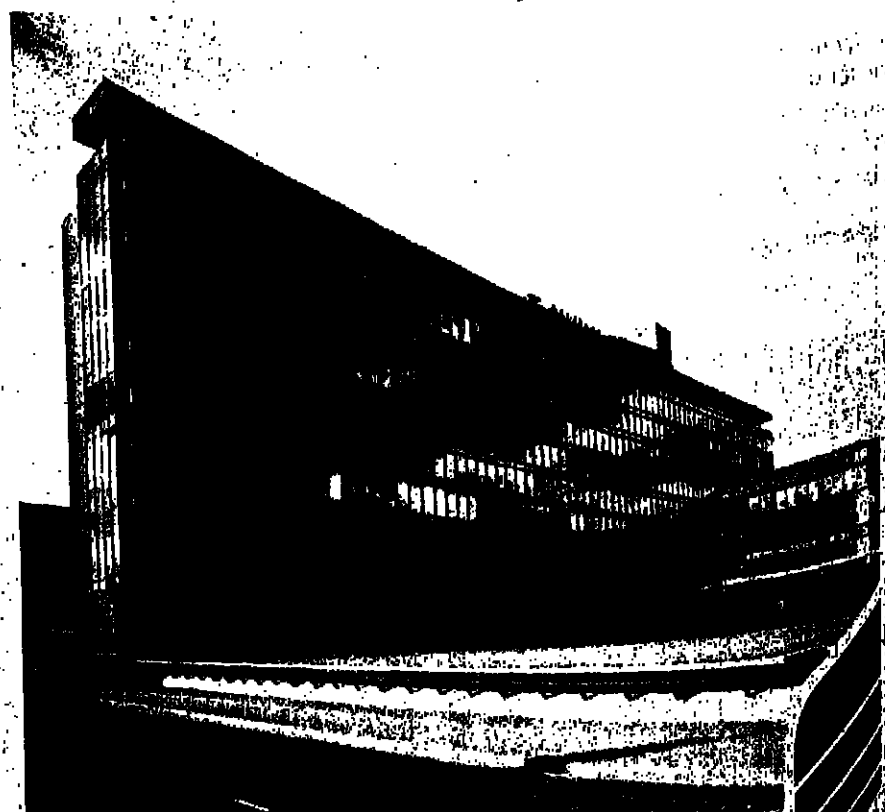
A large department in a new, purpose-built block within the Regional Headquarters building. It offers a pleasant, stimulating work environment in an attractive location easily accessible by most forms of transport.

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**COMMUNICATIONS** — An extensive network supporting 200 remote terminals at 15 locations.

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## NORTH THAMES GAS

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Computer Personnel Consultants

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Our Client, a major British Industrial Company, wishes to appoint a Business Analyst within their central management services department. The Business Analyst will hold responsibility for various assignments within production divisions and will supervise the relevant applications development personnel using the computer installation's new ICL 2960 hardware. Candidates should have a proven record of successful systems implementation and possess the necessary personal qualities and experience to represent the department in co-ordinating requirements of General Management within operating divisions. In addition to an excellent benefits package the person appointed can look forward to a positive career path within an expanding department where rewards are closely geared to one's personal achievements.

Ref. N5/1307

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MEMOREX

## WEST MIDLANDS COUNTY COUNCIL

**TRANSPORTATION & ENGINEERING DEPARTMENT**  
**URBAN TRAFFIC CONTROL - WEST MIDLANDS**  
**SYSTEMS ENGINEER £4769 - £5612 - TE 3295**  
**SOFTWARE TECHNICIAN £4344 - £5065 TE 3330**

The County Council has two urban traffic control systems installed in Coventry and Wolverhampton based upon Argos 700 and G.E.C. 4080 Computers. A programme of expansion of these systems throughout the West Midlands is planned to commence in the near future.

Two systems software personnel are required to play a leading part in this expansion and to develop the existing systems. Both the posts are based in Birmingham.

**SALARIES QUOTED INCLUDE SUPPLEMENT**  
For further details and an application form write or telephone quoting post reference number to:  
The Personnel Officer, West Midlands County Council,  
1 Lancaster Circus, Queensway, Birmingham B4 7DJ.  
Telephone 021-300 7824. A telephone answering service operates out of office hours. Return applications by 20th July 1978.

## THE UNIVERSITY OF MANCHESTER REGIONAL COMPUTER CENTRE

Director: Professor Gordon Black

Applications are invited for the following vacancies:

### THREE PROGRAMMERS:

Two to work within a team responsible for the development and support of the SCOPE 2 operating system on two CDC 7600 systems. The third to work within a team responsible for the development and support of the GEORGE 3 operating system on ICL 1906A/1904S. The appointees will be involved in performance evaluation and tuning of existing equipment and planning future requirements. Applicants should be educated to degree standard and should have some experience of systems programming. Experience with either CDC or ICL systems would be an advantage. Ref. 143/78/A/CW.

### ONE PROGRAMMER:

To work within a team responsible for the provision, maintenance and implementation of different compilers. Candidates should be educated to degree standard, together with experience with compilers, systems programming and a knowledge of Fortran, with one other high level language. A knowledge of CDC and/or ICL 1900 systems would be an advantage. Ref. 143/78/B/CW.

### THREE ASSISTANT COMPUTER OFFICERS

The three posts will be in the documentation and liaison sections, which are responsible (respectively) for acquiring technical and organisational information and presenting this in the form of user documentation of high quality, and for maintaining direct links with representatives in all user sites and departments. The work here involves advising and helping users with a wide range of backgrounds and computing expertise. Applicants should be competent in one of these high level languages and be able to communicate effectively. Ref. 144/78/CW. Salary for all three posts is: £3,189-£5,282 p.a. (U.S. \$ 14,477-24,000 p.a.).

These posts offer the challenge of joining a progressive organisation responsible for one of the largest installations in Europe. Further details and application forms (returnable by August 3rd, 1978) are available from The Registrar, The University, Manchester M13 9PL, quoting the appropriate reference.

## SDI SYSTEMPROGRAMMIER

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Teilnehmerbedingungen

- ★ Einsendung der Antworten auf dieser Seite (oder Fotokopie derselben).
- ★ Pro Absender nur eine Einsendung erlaubt.
- ★ Annahmeschluss Ihrer Lösung ist der 8 August, 1978.
- ★ Der Rechtsweg ist ausgeschlossen.

Angestellte von SDI sind von der Teilnahme ausgeschlossen.

Quiz:

After execution of the following code:

CSECT1	CSECT	CSECT1,12	LABEL1	LA	15.8(15.0)
USING	BALR	12.0	EX	11.4	
LM	10,12	FIELD2*(12)	BAL	3	LABEL2
COMRG	LR	0.10	LABEL2	NI	LABEL3 + 1.0
LABEL0	CLI	FIELD3,255	LABEL3	EOJ	
EX	11,LABEL2	FIELD1	DC	AL2(4096)	
BC	7,LABEL1	FIELD2	DC	A(LABEL0, 7,	
LH	15,FIELD1	FIELD3	DC	X'FF'	CSECT 1)
			END		

QUESTIONS

Answers

1. What does general register 0 contain? .....
2. What does general register 1 contain? .....
3. What does general register 3 contain? .....
4. What does general register 15 contain? .....
5. Which instruction or instructions have been modified during execution? .....
6. How do any modified instructions look after execution? .....

Name

Privateadresse

Tel. privat

Tel. Geschäft

z.Zt.-beschäftigt als

Bitte vervollständigen Sie die oben angeführten Instruktionen und senden Sie diese Seite an:

SDI Competition  
P.O. Box 301  
184 New King's Road  
London SW6 4NO

SDI Deutschland  
Competition  
Wilhelm-Diess-Weg 2  
8000 München 81

GRASP

GRASPV5

EPA

FLEET

sd 11.1.78



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# Analyst/Programmers

with two or more years' experience which should include working in Assembler.  
The ability to become effective quickly and move rapidly into systems specification and design.

Salary: Up to £6,500

The hardware is impressive, comprising of three very large 370/155s with a lot of additional equipment. Job interest is very high.  
The Company is shortly moving to a prestige building in Central London, offering first-class working conditions and facilities.  
Centre-File is a member of the Nat West Group. Employees enjoy the

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## EXPANSION PLANS

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MIDD/HERTS BORDER

£5,000-£6,500

Our Client, a major manufacturing organisation, is seeking additional staff to assist in the implementation of new projects.

You will join a team involved in a variety of commercial systems representing a stimulating and challenging environment for people wishing to extend their applications knowledge.

Successful candidates will have a background of either COBOL or PL/1 and have been involved in the implementation of at least one large commercial system.

The company is very conscious of developing employees skills and rewards them with a secure future and career progression. Apart from competitive salaries and four weeks' holiday, other attractive employee benefits are also provided.

Ref. N4/1307

## PRODUCTION SUPERVISOR

S LONDON

Non-Shift

£4,500

This is an excellent opportunity for someone currently engaged in either computer operations or data control, and seeking promotion into a non-shift supervisory capacity.

The successful applicant will lead three small teams working on data preparation, operating, and data control, and will be responsible for ensuring the smooth flow of production work through a busy data centre. He/she will require a solid computer background and a strong personality since they will provide the initial user interface.

The Company is one of the largest and most successful service organisations in Europe with a multi-million pound turnover. Users are served by a network linking major cities in the U.K. and the Continent. The South London data centre is easily accessible from Surrey, Kent, S.E. and S.W. London using either private or public transport.

Ref. N2/1307

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S LONDON/SURREY 2 years COBOL+ To £6,000

These positions present rare opportunities for experienced COBOL programmers to progress beyond the programming activity and gain total systems experience now.

Joining small teams the Analyst/Programmers will work in a highly professional environment and use the latest techniques in systems design including Database. Liaising with users throughout systems analysis and development individual career progression will be enhanced by direct involvement with each stage of a project from feasibility study to final implementation.

The Company operates a large and active D.P. Centre providing a range of user services and currently has a full programme of new work to be tackled. In addition to excellent starting salaries the positions carry an attractive range of benefits including Pension Scheme, 4 weeks' holiday, Subsidised Restaurant and Social Club.

Ref. N3/1307

## SEVEN PROGRAMMERS

C. LONDON

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The main installation language is COBOL and experience with any major manufacturers hardware will be considered. Carefully planned induction courses, with training in appropriate technical issues where necessary, will be afforded to the successful candidates who will assist with the development of several new systems all using communications techniques.

The Company is a major British Organisation with diverse interests in industry and offers excellent conditions of employment and the opportunity for rapid career progression to either analysis or systems programming.

Ref. N1/1307

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southern  
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## SENIOR PROGRAMMER FOR TWIN 2950 SYSTEM

£4191 to £8178

The Southern Electricity Board are about to embark on an exciting phase of expansion in Engineering Computing which will involve the installation of two ICL 2950 computers and a distributed processing system for the Real Time control of the Electricity Network. The successful candidate will lead a small team of programmers developing advanced systems and be involved with teleprocessing, graphical techniques and other exciting areas of program development.

We are looking for a person with a sound programming background and at least two years' COBOL experience who will be willing to learn new techniques and assist more junior staff to set and improve their standards of programming.

Opportunities for promotion within an expanding organisation are good for suitably qualified candidates and the Board operates a generous pension and life assurance schemes.

The post is located at the Board's Head Office at Littlewick Green near Maidenhead although travel within the Board's area may be necessary from time to time.

Applications on forms obtainable from the Secretary, Southern Electricity House, Littlewick Green, Maidenhead, Berks. SL6 3QS and returned to him quoting 5/78 by not later than July 31, 1978.

## Programmer

Based at Broadway, London SW1

£4688-£4988

Required to join a small team developing uses of computers throughout the Division. The successful applicant will assist in the transfer of existing systems from computer burgux to an in-house machine, and in development of future systems for this machine. Applicants should have several years experience of programming in a commercial environment and should preferably be familiar with the George 3 Operating system, Cobol, ICL software in general, and file management or database management packages in general.

All salaries are currently under review.  
For an application form please write to or telephone Miss Lesley Ambrose, Personnel Branch, 50-54 Broadway, London SW1H 0DB, quoting reference 38.  
Closing date 27 July, 1978.

## Thames Water

# MYRIAD APPOINTMENTS LIMITED

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The central systems team is responsible for developing group systems distributed to overseas D.P. centres. Major development plans include the introduction of a Database on the IBM 370/125 and a network of IBM System 34 computers throughout Europe.

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The person appointed will possess a programming background and will function as a team leader on certain projects. Promotion to project leader can be expected by the successful candidate showing drive and leadership qualities. The Analyst will design and implement systems and will have held similar responsibilities for at least one major system.

### ANALYST/PROGRAMMER

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The Analyst/Programmer, reporting to the group software manager, will hold responsibility for systems pertaining to one overseas subsidiary. Candidates should have a sound COBOL background, along with the ability to liaise with line management and produce results with a minimum of supervision. The position will be attractive to persons with proven analysis experience OR programmers wishing to move into systems analysis.

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- Digital hardware development
- LSI development

You will work with a young, co-operative team. The work requires a minimum commitment of two years. To enhance communication and familiarity with German publications we expect you to learn German.



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(Anag.)

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PL1

Burton-on-Trent, Chatham, City, Croydon, Guildford, Harmondsworth, Horley

RPGII

Bury St. Edmunds, Cambridge, City, Colchester, Crawley, Greenford, Kingston, Wembley

Fortran

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The Library Association Council has approved the creation of a new post in the Association's Secretariat, working directly to the Deputy Secretary, of Bibliographical and Information Systems Officer. The post will be responsible for the Association's concerns in bibliographical standards and bibliographical systems and services, on-line developments, computer software and hardware developments. Viewpoint: the creation of a national forum for the discussion of related systems (including Post Office aspects and costings), co-ordination of the user view of nationally provided services, and also to ensure professional involvement in current international developments in these areas, e.g. Unesco and Council of Europe programmes.

It is expected that the successful applicant will have a wide knowledge of general information and bibliographical information systems and services, nationally and internationally, and will have some recent experience of work in on-line systems.

The post offers an exciting opportunity for someone with energy and imagination to work at the centre of this activity.

The salary agreed by L.A. Council is on a scale rising to £5,985 p.a.

Persons interested should apply in writing to the Deputy Secretary's Department, The Library Association, 7 Ridgmont Street, London WC1E 7AE, for a detailed job description. Previous applicants should not re-apply.

### New ICL 2970 Installation Operators

Up to £4,150 (including shift allowance)

Southwork's new Computer Services Division will be installing an ICL 2970 2 Megabyte Computer in November 1978.

Vacancies now exist for experienced Computer Operators to join our team. We run a two-shift system where each shift will be responsible for on-line operations, Data Control and the Media Library.

The successful applicant will have had at least one year's experience on a large multi-programming machine. We offer the usual excellent public service conditions, including 22 days holiday, a restaurant and good sports and social facilities.

If you are an ambitious person keen to develop your technical and personal skills, telephone 01-701 2870 anytime for an application form or write to:

The Personnel Officer, ICL 2970 Installation of Southwork, 27 Packham Road, London SE8 6US, quoting reference C/8/8610 and job title. Closing date 6.10.78

### Southwork

**FORTRAN**  
Senior programmer position available for experienced programmer with extensive knowledge of FORTRAN and experience in the use of the ICL 2970 computer. Salary: £3,500 - £4,500 p.a. plus benefits. Apply to: **IP** 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 60



## PROJECT LEADERS/MANAGERS

WEST END

to £8500

Our client, a major UK Software Services Group, is urgently seeking high-calibre project leaders with experience of either mainframe or microcomputer commercial systems. Several years relevant D.P. experience is required, and although a successful previous leadership record would be an advantage, candidates with lesser experience who can demonstrate real potential will also be considered. Travel within the UK and Europe may be involved in some cases. Ref. B12/4A.

## COBOL PROGRAMMERS

WEST END

to £8500

The same Software House client is also anxious to recruit a number of COBOL programmers to play a significant role in the continued planned growth of this company. Successful candidates, who may have a background on any of the major mainframes, can look forward to working in a stimulating environment with varied and interesting assignments. Exceptional scope for career development is offered to high-calibre people. Ref. B12/4B.

## ANALYST/PROGRAMMERS

CROYDON

to £6200

Based in Croydon and within easy reach of East Croydon station, our client is looking for people with analytical experience and a sound COBOL programming background to work on a variety of interesting projects. Preference will be given to candidates with experience of IBM 360/370 equipment. Although the work will be predominantly of an analysis nature, some programming using interactive CMS techniques will be required. Training in CMS will be given where necessary. Hardware is IBM 370/155/158 operating under OS/MVS. Ref. B12/3

## ANALYSTS and COBOL PROGRAMMERS

CITY OF LONDON

Analysts to £7000  
Programmers to £5750

Our client, a major commercial bureau using Burroughs hardware, wishes to recruit a number of COBOL programmers and analysts. Programmers should have a minimum of 18 months COBOL experience, preferably on Burroughs medium-range hardware, while analysts should be able to demonstrate experience in the successful design and implementation of at least one major project. Ref. B12/5.

For more information about these and many other opportunities, please write or phone Mike Doran. All replies will be dealt with in strictest confidence.

**Macrolog Management Services Ltd.**  
2-3 Olden Square  
London W1R 3AD. Tel: 01-437 2243  
(24 hour service)  
\* Recruitment Consultancy Division \*

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Computer Personnel Consultants

SLOUGH

To £5,000

Our Client, a busy engineering company, is currently developing several on-line real-time applications.

If you would like:

- \* To receive training in advance IBM software
- \* Develop COBOL programs involving database and TP systems
- \* Work on a variety of applications projects
- \* Five weeks' holiday a year
- \* Excellent starting salary and conditions of employment
- \* To join an active sports and social club

— and you have a minimum of 12 months' COBOL programming experience, then this could be a good opportunity to accelerate your career.

Ref. W1/2109

24-hr. answering service  
Please telephone for a confidential  
discussion or write to:  
30 Fleet Street London EC4Y 1AA  
01-353 0881

EDITOR FOR  
COMPUTER WEEKLY

An editor is required for Computer Weekly, Britain's leading computer publication which is distributed to more than 82,000 computer personnel in the UK every week, and to a further 12,000 overseas readers ten times a year.

The post, one of the major editorial positions in the UK technical press, will, ideally, be filled by a person with experience of both journalism and the computer industry.

The successful candidate will be required to maintain the high technical and reporting standards which have been built up over the past twelve years, making Computer Weekly the leading newspaper of the computer business.

In this task the editor will be able to call on a team of 14 journalists whose technical ability and experience are second to none in the field of computer publishing.

Directing and motivating this team, and formulating the editorial policy in conjunction with the publisher will be the editor's main responsibilities.

The salary is negotiable, depending on the successful candidate's qualifications and experience, but will be commensurate with the position of Computer Weekly as one of the most important journals to be published by IPC Business Press.

Please apply to Chris Hipwell, Publishing Director, IPC Electrical Electronic Press, Dorset House, Stamford Street, London SE1.

SYSTEMS  
ANALYST/PROGRAMMER

This is an exceptional opportunity for an Analyst/Programmer seeking additional responsibility in an expanding company.

We require an Analyst/Programmer to take responsibility for the day-to-day control of our IBM Systems 32 department, the maintenance of all existing systems and the development, design and installation of further applications in the commercial field.

The successful applicant will have programming experience, and a knowledge of RPG II.

Salary for this important position will be in the region of £5-£6,000. In addition to this the company operates a contributory Pension Scheme.

For further details apply to: P. A. Carne, British Vekola Ltd., 238 Bath Road, Slough SL1 4DU. Tel. Slough 28281.

Institute of Obstetrics and  
Gynaecology  
University of London  
Queen Charlotte's Maternity  
Hospital  
Goldhawk Road, London W6 0XG

Applications are invited for the post of

SCIENTIFIC  
PROGRAMMER  
GRADE 18

at the Institute of Obstetrics and Gynaecology, Queen Charlotte's Maternity Hospital. Salary scale £3,384-£5,804 plus £450 London weighting. The primary function of this post is to support a new PPT1 programme remote entry terminal connected to the University.

Computer installation. The work involves a wide variety of software development using assembler and high level languages, plus experience of real-time programming. The successful applicant will work in a small, lively research department with a lot of scope for personal development.

A scientific background (a Honours degree level) would be an advantage. Registration of suitable candidates for a higher degree would be a possibility. Further details may be obtained from the Secretary, Institute of Obstetrics and Gynaecology, Chelsea Hospital for Women, Devonport Street, London SW3 6LT.

Applications, together with curriculum vitae and the names and addresses of 2 referees should be sent to: Dr G. S. King, Chemical Pathology Department, Queen Charlotte's Maternity Hospital, Goldhawk Road, London W6 0XG, by Monday 19 October 1978.

For further particulars and an application form, returnable by Thursday, 28th September, 1978, please send a stamped addressed envelope to: Dr G. S. King, Chemical Pathology Department, Queen Charlotte's Maternity Hospital, Goldhawk Road, London W6 0XG.

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## OPERATORS

JOB SPOT  
London AreasICL OPERATIONS SUPERVISOR  
£5,850 DAYS ONLY

Our clients have recently upgraded their computing facilities to ICL 2901 and are currently seeking an Operations Supervisor to manage the day-to-day running of the system. The successful candidate will be responsible for the supervision of the operators and the maintenance of the system. The salary is £5,850 per annum, days only.

The successful candidate will be required to maintain the high technical and reporting standards which have been built up over the past twelve years, making Computer Weekly the leading newspaper of the computer business.

In this task the editor will be able to call on a team of 14 journalists whose technical ability and experience are second to none in the field of computer publishing.

Directing and motivating this team, and formulating the editorial policy in conjunction with the publisher will be the editor's main responsibilities.

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The PIX Remote Computing Facility is an intelligent data communications system which offers IBM users the most advanced teleprocessing facilities. Its successful European launch from the U.K. earlier this year gives EMI clear market leadership in Data Communications.

IBM users have been shown how to avoid the complexities and limitations of conventional TP techniques at over 500 installations in U.S.A. and Europe.

To continue the Europe-wide expansion EMI need more key people. These are probably the most important Data Communications openings of the year, with earnings capability to match. Only the best need apply.

Please apply giving brief personal and career details to:  
S.J. Keat, Director SE Labs (EMI) Ltd.,  
EMI Technology (Data Communications Division),  
Spur Road, Feltham,  
Middlesex, TW14 0TD, England. Tel. 01-890 1477.

A member of the EMI group.  
International leaders in music, electronics and leisure.

SOFTWARE SUPPORT  
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Based in U.K. but able to travel throughout Europe. Directly responsible to the Product Manager.

Applicants must have 2-3 years IBM System Programming experience with in-depth knowledge of operating systems and TP monitors/handlers.

SALES CONSULTANTS.  
Front line selling of PIX systems. Vacancies in the U.K., France, Benelux, Germany and Scandinavia.

Applicants are invited from people with proven sales success who have a working knowledge of IBM teleprocessing concepts. Successful applicants will be expected to be locally resident.

CONTRACT  
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Are you good enough? If so —  
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- 1 A personal health scheme covering sickness for six months
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We currently require Programmers to work on a complete spectrum of applications, languages and operating systems, based in LONDON and the HOME COUNTIES, EUROPE and the MIDDLE EAST.

If you can offer expertise in any of the following:

1800 COBOL > G3, VME/K OS COBOL  
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If you are a professional and want to be treated like one contact:

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51 LONG LANE, WEST SMITHFIELD  
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Closing date 8 October 1978.  
Previous applicants need not re-apply.

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For further particulars and an application form, returnable by Thursday, 28th September, 1978, please send a stamped addressed envelope to: Dr G. S. King, Chemical Pathology Department, Queen Charlotte's Maternity Hospital, Goldhawk Road, London W6 0XG.

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## THE SALES BIT

Most insular  
language of all

ONE of my principal interests is the operational side of theatre, which involves anything from production (set-painting. After an evening rehearsal the standard procedure is to drift to the bar and discuss the play or whatever topic comes to hand.

One of my friends at the theatre, who has since left, works in the computer industry, so inevitably conversations between us often drifted into the computer arena.

The other day I was at the theatre and was talking to one of my colleagues who had not realised the reason for the departure of my computer industry friend was his relocation due to a change of employer.

"Is he still in the shipping industry?" he asked. "Shipping?" I replied. "No, he's a systems programmer."

"A what?" he asked. "In the computer industry," I explained. "I see, that's a change. I was never absolutely sure about what he did before, but from the sound of things, he either used boats or built them."

I was very surprised to discover this new facet of my friend. "I didn't know that."

"Oh yes," said my thespian friend, "he was involved with deck equipment. I heard him mention it several times."

My first reaction was to laugh hysterically, but the look of absolute conviction on his misinformed face made me see him momentarily as a prospective first-time computer user. He knows nothing of computers, and therefore related the languages presented to him to the context of his own experience. The result, misconception and confusion.

We have an amazing insularity within the computer industry. Many de-

light in the vagaries of what might be called Macro English: "The ram (random access memory) stood on the deck (Digital Equipment Corporation) and looked towards the moss (Metallic oxide semiconductor) covered prom (programmable read only memory)."

Others enjoy creating a veil of mystique by the indiscriminate use of technical jargon, perhaps to compensate for their own inadequacy, while others use the language of the industry so much in the normal pursuit of their occupation that they don't know when to switch off. This applies to many salesmen, particularly when talking to potential first-time users, to whom the world "input" is the epitome of technical mystery.

When a typical prospective computer user considers electronic data processing, he simply seeks a black box which will provide a painless solution to his business problems. This process alone makes him feel insecure. Consequently, to be dragged into a morass of complex and incomprehensible verbiage serves only to make the proposition seem less of a good idea. If a salesman derives any pleasure at all from the egocentricity of parochial language he should endeavour to learn the jargon of the application area and industry into which he is selling. That way the client can be convinced that his problem is understood and can thus assume the solution will be workable.

The use of jargon may provide a "buzz" for those near to the computer industry, but it can be a significant barrier to success — as are all actions and attitudes in selling, or indeed life, which only appraise a situation from a single viewpoint.

TRADER

University of Sussex

## Programmer

(Male/Female)

To work in the Arts and Social Studies Research Support Unit starting as soon as possible.

Applications are invited from experienced programmers to work on a small unit analysing data from a number of arts and social science disciplines. A thorough knowledge of Fortran is essential and knowledge of Algol 68 would be an advantage. The work is varied and offers scope to acquire experience in systems programming, numerical techniques and the use of statistical packages on an ICL 9045 and a CDC7600 computer.

Salary scale according to experience and qualifications.

£2308-£2838 per annum  
£2033-£3809 per annum  
£3883-£8565 per annum

Further details and application forms returnable as soon as possible, are available from the Assistant Secretary (Education), Office of Arts and Social Studies, University of Sussex, Falmer, Brighton, BN1 7QN (060755, ext. 1050, Miss Pratt).

30 REGENT STREET, NOTTINGHAM

requires additional

PROGRAMMING  
STAFF

To join a rapidly expanding company. Applicants should have a minimum of one year's experience in COBOL, preferably on Burroughs' equipment. Future possibilities will be to work on ABS 'Multibus', Data General and DEC equipment. Car driver essential.

Benefits are good. Salaries according to experience. Four weeks holiday, bonus scheme.

Contact: Lynda Dore. Telephone 43414

## INSTITUTE OF OCEANOGRAPHIC SCIENCES

SCIENTIFIC OFFICER/  
HIGHER SCIENTIFIC OFFICERNUMERICAL METHODS IN WAVE  
RESEARCH

The Institute of Oceanographic Sciences is extending its existing research into numerical modelling of the dynamics of high waves and is looking for someone with high ability in numerical analysis to work on this project.

Qualifications  
A good honours degree or equivalent qualification in Mathematics or Computing with numerical analysis, and an interest in application of numerical methods in fluid mechanics is desirable. At least two years' relevant post graduate experience is required for Higher Scientific Officer.

Salary and Conditions  
Appointments will be made as a Scientific Officer (S.O.) or Higher Scientific Officer (H.S.O.), depending on qualifications and experience, with the following salary scales:

S.O. £2830 p.a. - £4418 p.a.  
H.S.O. £4101 p.a. - £5448 p.a.

Starting pay may be above the minimum.

Staff of the Council are not Civil Servants, but their pay and conditions are similar to those of the Civil Service.

There is a non-contributory pension scheme and generous leave allowance. Application forms and further particulars are obtainable from The Secretary, The Institute of Oceanographic Sciences, Brook Road, Wormley, Goldersham, Surrey GU8 5PU.

(Telephone Wormley 0428 79141) quoting reference No. 78/011/683.

Closing date for applications: 23rd October, 1978.

NATURAL ENVIRONMENT RESEARCH COUNCIL

COMPUTER  
MANAGER

Opportunity for experienced man or woman to manage and develop NCR 8250 system undertaking order processing and sales accounting for long-established wholesale newsagents. Some weekend working necessary; ability to program an advantage. Competitive salary, with good employment conditions. Contracted-out pension scheme available.

Please apply with relevant particulars to:

Managing Director, M. Mapstone Ltd.  
Wrotesley Street, Birmingham B5 4RS

SYSTEM APPLICATION  
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This company offers a unique opportunity to work in Europe and in the forefront of your electronic field. Return to the company for a free brochure and application form.

For



Our clients a major manufacturing group in the BASINGSTOKE area are acquiring a dual ICL 2960 configuration to replace their existing hardware, within the Management Services Division. Use is planned of IDMS Data Base and extensive on-line working. Distributed processing will operate on a country wide basis.

The Division currently comprises 90 people, working with a mixture of mini and main-frames on all aspects of Group business. In advance of receiving the new hardware in mid 1979 it is planned to revise the majority of the company systems to reflect expanding interests and the new mode of operation.

Vacancies exist for

## Systems Analysts and Programmers

particularly with Data Base and TP experience.

Salaries from £4,700 to £6,500 will be offered to senior people of proven experience and ability.

### Technical Support

The Company intends to set-up a technical support team and is looking for a PROJECT LEADER with VME/B experience, together with three PROGRAMMERS with suitable operating system experience. This is an outstanding opportunity to gain experience in the operating and application systems of the 1980s in a major manufacturing environment. The company is to become a national reference site for 2900 on-line Material Control Systems using IDMS Data Base.

The Company offers its employees generous fringe benefits and of course the peace and quiet of living in the Hampshire Countryside that surrounds Basingstoke (and if the cost of moving puts you off - don't worry - they will pay all your relocation expenses and help you as much as they can to settle down as quickly as possible).

Please write in the first instance giving personal and career details to: Miss Anthea Mallett, FCB/Beckwell, 84 Baker Street, London W1M 2DL.

**FCB/Beckwell**

84 BAKER ST. LONDON W1M 2DL

## Abraxas Recruitment Division

**ABRAXAS**

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## OPERATIONS

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MIDDLESEX	OP.	1 YR. +	J/GEN

### UNIVAC

W. LONDON, SHIFT LEADER/SENIOR OPERATOR required for busy installation. Current equipment includes a 80/60 running OS4 although OS3 would be considered. Ample opportunity for progression in this well-known professional installation. At least 18 MONTHS experience required. Good company benefits along with overtime make this position extremely attractive.

### DOS/VS

#### —JOBS IN ALL AREAS!

SENIOR AND JUNIOR OPERATORS are required by companies throughout LONDON and HOME COUNTIES. Once again, salaries and working conditions are excellent. Benefits cover Mortgage Subsidies, Travel concessions, Life Assurance, Free meals or Restaurants, Annual Bonus and many more. If you are considering a move, please contact us for details of positions in your area.

### HONEYWELL

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### BURROUGHS

C. LONDON OPERATORS are needed now for Manufacturing Co. using BURROUGHS under MCPV 12 months' experience minimum. 4 weeks' holidays. Season ticket loans. Free Life Assurance.

### BURROUGHS

SURREY, SENIOR OPS and OPS required for well-established configuration undergoing system modifications. Some which has created openings for experienced Operators, who wish to further their experience. Excellent working conditions and staff benefits.

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C. LONDON OPERATORS Required with or without PDP/DEC experience for Merchant Bank currently running PDP 11/70 x 2. At least one year's experience on ANY MAINFRAME will suffice. This job offers the opportunity to WORK ABOARD.

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FOR VACANCIES IN YOUR AREA PLEASE RING ABRAXAS NOW

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## ISLE OF WIGHT COUNTY COUNCIL

Treasurer's Department  
**R.P.G. II PROGRAMMER**  
AP2/3 Salary £3279 to £4146 per annum inclusive

The County Council operate an I.B.M. 128 370/115-2 with 3 x 3340, 2 x 2411, 1 x 3203, 1 x 3540, 1 x 2501 and applications are invited for the above post from programmers with at least 2 years experience of R.P.G. II associated with an I.B.M. installation working under DOS/VS and Power, knowledge of VSAM would be an advantage.

Application forms and job description can be obtained from the County Personnel Officer, County Hall, Newport, Isle of Wight.

Closing date: 13th October, 1978.

## BUILDING SOCIETIES A RECRUITMENT FEATURE

On September 28th Computer Weekly will be highlighting career opportunities with Building Societies.

To advertise in this high reader interest feature contact:  
Josie Poole or John Farrar on  
261 8454 or 261 8095

### THE POLYTECHNIC OF WILM POLYTECHNIC CYMRU

#### COMPUTER CENTRE

Applications are invited for the following newly created posts in the Polytechnic's Computer Centre.

The Centre, which is housed in a purpose built building, provides service using four computers which include the latest DECsystem 20, PDP 11/70, and applications software.

#### 1. CHIEF SYSTEMS PROGRAMMER

Salary: £5748-£5900 per annum  
£312 non-consolidated supplement (AP12/16)

Applicants should possess a degree or equivalent qualification and have considerable experience of systems programming.

#### 2. SENIOR SYSTEMS PROGRAMMER

Salary: £4461-£4771 per annum  
£312 non-consolidated supplement (AP12/16)

Applicants should possess a degree or equivalent qualification and have substantial experience of systems programming.

#### 3. SENIOR APPLICATIONS PROGRAMMER

(2 posts)  
Salary: £4461-£4771 per annum  
£312 non-consolidated supplement (AP12/16)

Applicants should possess a degree or equivalent qualification and have substantial experience of systems programming in a variety of languages, preferably in COBOL and BASIC.

#### 4. PROGRAMMERS

(2 posts)  
Salary: £2887-£4320 per annum  
£312 per annum supplement (AP12/16)

Applicants should possess a degree or equivalent qualification and have substantial experience of systems programming in a variety of languages, preferably in COBOL and BASIC.

#### 5. COMPUTER OPERATOR

Salary: £1808-£2887 per annum  
£312 non-consolidated supplement (AP12/16)

Applicants should have had experience of computer operation and have a good knowledge of the I.B.M. 128 370/115-2.

Applicants should submit their applications, in triplicate, to the Personnel Officer, Polytechnic of Wales, Newport, Wales. Closing date: 10th October 1978.

#### AUSTRALIA CALLING

For details of employment in Australia, contact: Computer Personnel, write, enclosing C.V. to:

PROFESSIONAL STAFF  
388 Bourke Street  
Melbourne, Vic. 3000, Australia.

## Ascii through the Logic Gate

An epic in 32K words, by Richard Forsyth  
Block 15 (Jailhouse Block)

Hex and his friends are now trapped inside their crater with the talking Sasquatch. While they ponder their fate, Extracode is finishing off his interrogation of Simula.

SIMULA was still trying to digest what Benzadrine had told her when Extracode's voice penetrated her private thoughts.

"That will be all for now."  
"Oh, yes," she replied uncertainly.  
"Miss Benzadrine will conduct you to your quarters."  
"Quarters?" The word had conjured up in her guilty mind a picture of a prisoner being hanged, drawn and quartered. "You will remain with us for the time being. I trust you will find your stay a pleasant one," said the Inspector.

Benzadrine led her out, placid like a lamb to the slaughterhouse, and took her to a wing of the building where a little room had been prepared. There wasn't a peephole in the door or any bars on the window, but the idea of a prison did somehow suggest itself to her.

When Benzadrine left, Extracode rose and went to a bookshelf behind the desk. He selected a volume and pulled it out, not to read but to activate the unlocking mechanism which caused his bookcase to swivel round revealing an entrance to a large well-lit room, the far end of which was divided off by a glass partition. In the further half were banks upon banks of the latest electronic equipment. At the near end sat two robots behind a table the surface of which was an illuminated chart of the Sierra Nueva region, holographically contoured. The nearer of the two nodded in his direction and beckoned him in.

"Ah Derek! The third member of our panel," said the robot. "Do join us."

The speaker was Ivor Glitch, database administrator. Next to him sat Commander Herman Kludge, the dynamic debugger at whose hands Sheriff Sprocket had met a sticky end. Together with Extracode they constituted the Committee On Bug Rectifying action, COBRA, and their brief — the detection and correction of errors throughout the System — made them one of the most powerful groups in the land. In fact, in a case such as this, the "hot pursuit" of a rogue android, the only authority that could countermand their orders was the Universal Network Operating System.

## MICRO FOCUS

needs to add FOUR KEY PEOPLE to its professional team

We develop software products for microprocessors and sell them in Europe and the U.S. The success of our portable CIS COBOL compiler is permitting us to expand the company and strengthen our development, sales and support activities. Each position offered is potentially at management level and its responsibilities will increase as Micro Focus continues to grow. The work location is at our new offices in St. John's Wood, though travel may be requested from time to time to visit customers here and abroad. You will be working in close collaboration with other members of the company but will be specifically responsible in one of the following areas.

### TECHNICAL WRITING/LECTURING:

You should have demonstrated your ability to form good and informative prose from technical specifications and be able to generate and test realistic example programs. From time to time we are asked to prepare and give courses in microprocessor oriented subjects and would wish you to take responsibility for this facet of our business.

### PRODUCT VALIDATION AND DISTRIBUTION:

This requires organising ability and attention to detail combined with a desire to get things done and the ability to get other people to do them. You need to be able to build a software product from a set of modules received from development staff, produce and run system tests and organise and maintain external software releases.

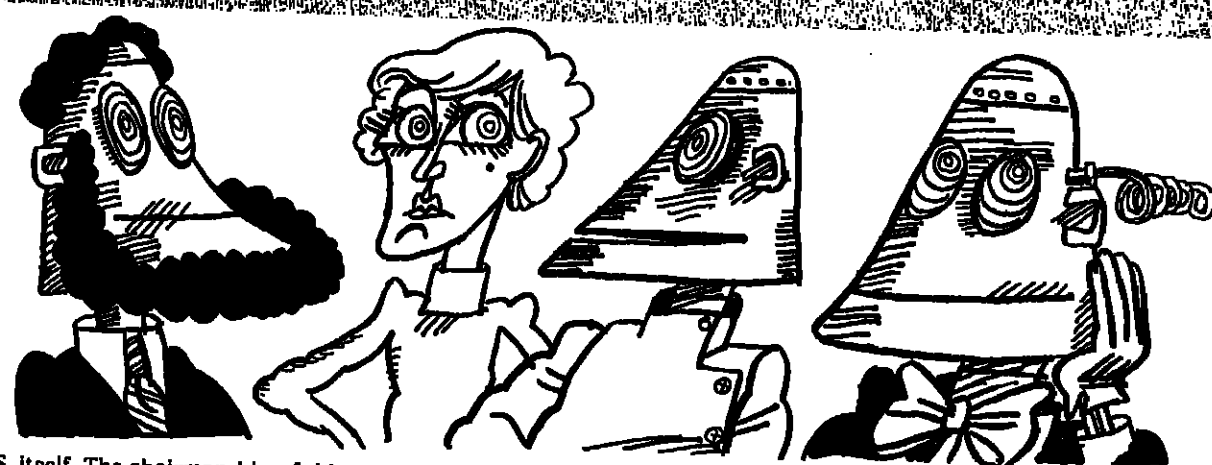
### SOFTWARE DEVELOPMENT:

This job needs someone who is able to combine new technology with traditional method and differing temperaments.

### SOFTWARE SALES:

You need a good grasp of the technical strengths and commercial potential of our products in the market place, combined with the ability to find the decision maker in a prospect and close the sale. You will be selling to large and small organisations which are geographically diverse and a willingness to travel and to organise the Micro Focus presence at shows at home and abroad is essential.

If you are attending the Personal Computer World Show at the West Centre Hotel on 21st-23rd September say hello to Paul O'Grady, Sales Manager, or Brian Reynolds on Stand No. 8, Oldham Road, Oldham, Greater Manchester, M20 9JL. Tel: 01-627 5814 or 228 1811. 18 Vernon Yard, Portobello Road, London, W11.



UNOS, itself. The chairmanship of this committee rotated on a monthly basis. This month Glitch was in the chair, as previously Kludge had been. Extracode's turn at presiding would come next.

Extracode took his place on Glitch's left. Standing in front of them on the carpet looking damp and bedraggled after cycling through a downpour, was James Hock.

"I hope you had a productive afternoon," said Glitch as Extracode sat down.

"I think I have," he replied. "I believe I've got the lead we've been seeking."

"Excellent. Well, just to put you in the picture, this is Mr Hock who has had some valuable things to tell us. Apparently, he was waylaid by the Kid and the human, who stole his motorbike. He tracked them down to San Guine and apprehended them. Unfortunately, they escaped — with help from inside the System. Then the conspirators split up and Cleo, with one of the traitors, eluded our patrol which gave chase on a Cray-2."

There was a sharp intake of breath from Extracode.

"I needn't tell you what a serious breach of security this represents," continued Glitch. "But while our forces were floundering Mr Hock had the presence of mind to set out to rediscover his vehicle, which they had used in their getaway. He found it abandoned by the roadside near the Sierra Nueva foothills — just here," he said, tapping the map-table. "Mr Hock also consented to a mind-probe which has supplied us with information about Cleo, on whose behaviour patterns we have so far had inadequate data to establish a predictive profile. We have fed this into the Psycho-Evaluative Estimation Program and are expecting the results in a few minutes."

Extracode was less than thrilled. Somehow, he resented the triumph of the soulless formulae of psychonomic calculus over the seasoned detective's insight.

Glitch turned from him and spoke to Hock. "Your efforts will not go unrewarded."

Hock purred inwardly. Even the indignity of the mind-

probe had been worth it for the promise he had obtained — a trial of his text-processing package.

Just then a bell sounded on the red scrambler modem by Glitch's right hand. He reached down and plugged it into the decryption socket behind his ear. Extracode watched the orange carrier-signal lamp flickering. When it finished Glitch spoke first to Hock.

"You may go now."

"What about the installation of my string-processor?"

"Later, later! This is an emergency."

Hock made his obeisance with an elaborate pantomime of bowing and scraping. When the door finally closed on him, Glitch spoke hurriedly.

"Word has just come though that Hex and his guerrillas are holed up in the crater of a dormant volcano in the Sierra Nueva. They are under observation by two trained animal-handlers. Kludge, I want you to take a detachment of storm troopers up there right now."

Kludge rose, saluted and clicked his heels.

Extracode felt a twinge of regret. He should have been glad that the guess-work was over and Hex's days were numbered, but in fact he was rather annoyed this his subtle scheme for setting Simula as bait to catch the Kid, based as it was on an intuitive grasp of the nice balance of human and inhuman motivations, would not now be needed. His painstaking labour would never now come to fruition.

"Remember," added Glitch as Kludge reached the door. "I don't care about the rest but I want the Kid alive."

"Alive?" queried Kludge.

"The high-level goal-coordinator has issued a directive: get him, but get him alive."

This was news to Extracode too. The goal-coordinator was a permanently resident routine that sorted out competition between System priorities — the conscience and the Supreme Court of the System rolled into one. The fact that it didn't simply want to crush Hex was intriguing.

Has the hardware gone soft? More firmware next week.

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## SHADOW II PERSONNEL

Rendek is a medium-sized international software house with offices in the Netherlands, England and the U.S.A. Our group of companies work in various fields and aspects of the computer industry with the main emphasis on database and data communications projects, and owing to our marketing of Shadow II in the Benelux countries, the majority of our teleprocessing work is concerned with Shadow.

We require Cobol programmers and analysts with at least one year's experience with Shadow to join our companies as part of our planned expansion for early 1979. Successful applicants will work in one of our teams on projects in the Netherlands or in the U.S.A., where salaries, expenses and benefits will be well above average.

Initial interviews will be held in London throughout October.

Please write with personal details or telephone for an application form, when a mutual appointment can be arranged, to our London or Amsterdam office.

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